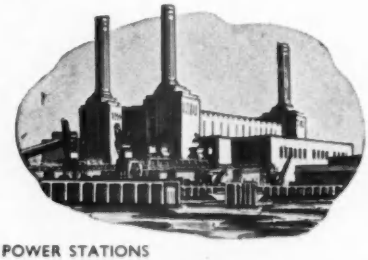
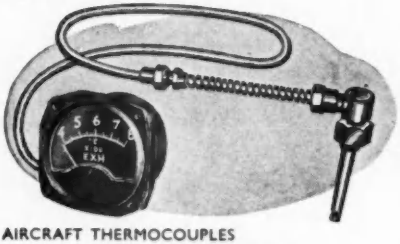
ELECTRICAL TIMES

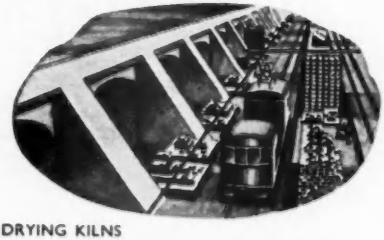
THURSDAY
5 MAR.
1953
NINEPENCE



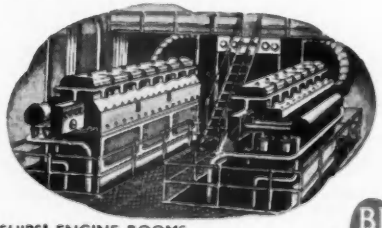
POWER STATIONS



AIRCRAFT THERMOCOUPLES



DRYING KILNS



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THE DOMESTIC APPLIANCE SECTION OF **JOHNSON & PHILLIPS LTD.**
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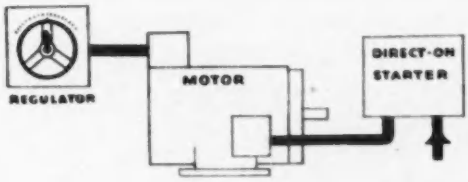

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When you need stepless variable speed on a.c., all you have to do is to call L.S.E.

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Thousands of N-S motors are in use. By enabling the speed to be adjusted exactly to the requirements of the driven machine or process, *they make possible increased production and improved quality* in many fields of use.

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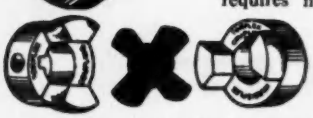
TYPE "K"

The type "K" Harrisflex (TORFLEX) coupling as illustrated has 5 special features. It is easy to fit, requires no lubrication, provides a cushioned drive, clock or anti-clockwise rotation and no noise.



It is simple in design, having only three working parts, two identical metal halves connected by a flexible spider-shaped element. A wide range of various types of couplings is available to meet most requirements.

Full details available from DEPT. E

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WITH

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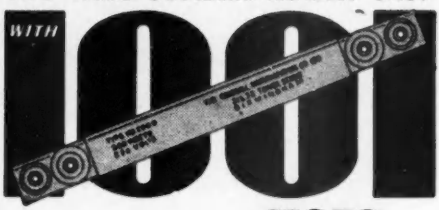

USES

IN its variety of forms, the Cressall steel jacketed unit heater is the solution to most heating problems. Let a Cressall Technical Expert discuss heating with you before you decide. He will be happy to help.

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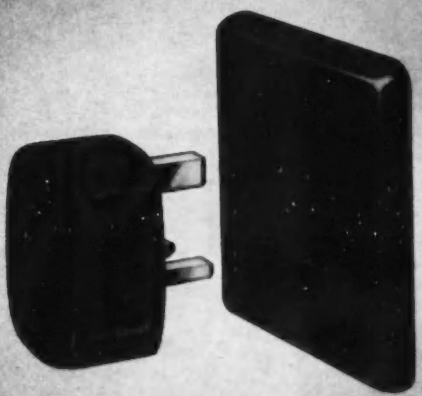

13 AMP. SOCKET OUTLET FUSED PLUG TO B.S. 1363

DETAILS ON REQUEST

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···there is a Belling cooker to suit every home and every pocket whether it's···

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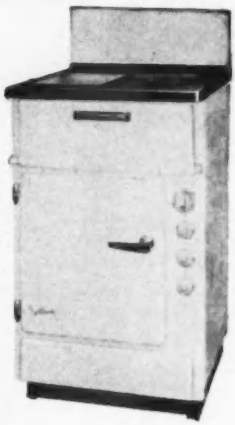

The BELLING STREAMLINE has 2 boiling-plates and a grill-boiler. The oven is extra large with an inner glass door and interior lighting. Automatic heat control throughout. White or cream vitreous enamel. Price **£49.10.0.** Available on wheels 55/- extra.

The BELLING 47 is easy and economical to use. The full size inner glass door is armourplate and steam free. 2 boiling-plates and grill-boiler. Large warming cupboard. In gleaming white or cream vitreous enamel. Price **£34.12.6**

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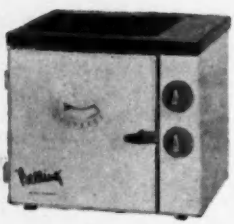

The WEE BABY BELLING is ideal for the small home or as an auxiliary where otner means of cooking are used. But it will cook a full meal easily, quickly and economically. There's room for three saucepans on top. Cream vitreous enamel. Price only **£6.19.6.**

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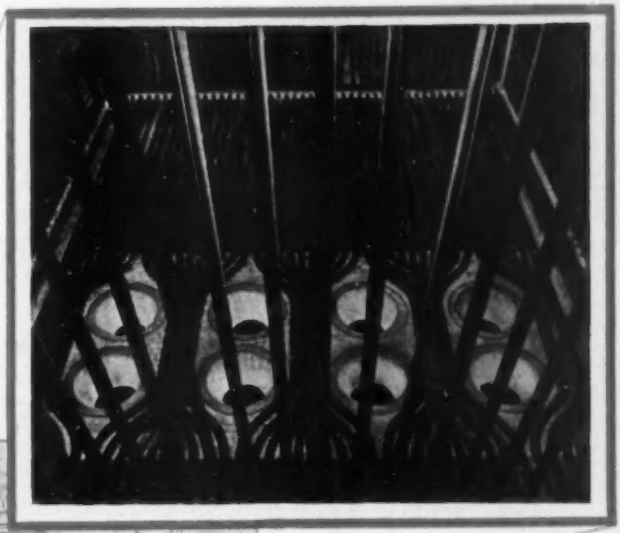
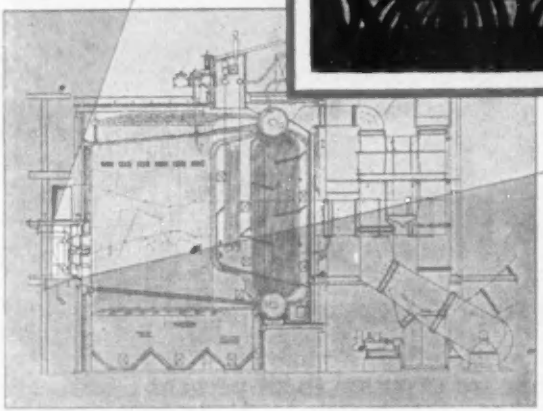


View of combustion chamber looking upwards.



BOILER PLANT for OIL and GAS FIRING

Steam raising plant of an integrated furnace design, developed by International Combustion Limited, has been installed at Coryton. This will burn *oil or refinery gas* and is applied to power and process steam requirements.

ENTERPRISING ENGINEERING BY

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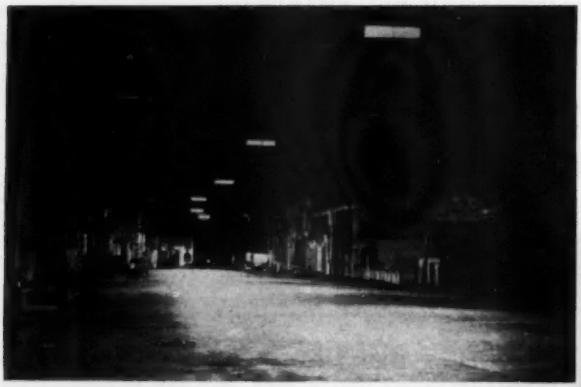
The plant comprises three boiler units each producing 180,000 lbs. per hour steam at 615 psi and 750° F—peak capacity 200,000lbs. per hour for two hours rating.

WORKS: DERBY, ENGLAND; PORT ELIZABETH, AFRICA; SYDNEY, AUSTRALIA



(Left) Revo Sol-etern fittings on Span wires in Singapore.

(Below) The Bus station at Malmo, Sweden, illuminated by Revo Sol-etern fittings.

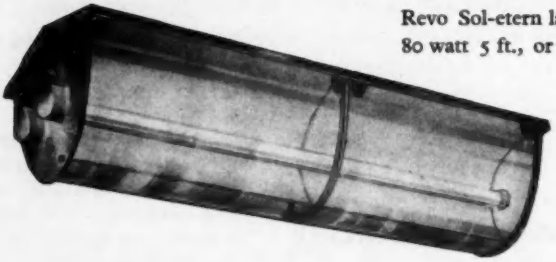
In Sweden and in Singapore they see by . . .

'SOL-ETERN'

STREET LIGHTING FITTINGS

Revo street lighting fittings are exported to all parts of the world, and the examples shown here are typical of the many installations where "Sol-etern" fittings have been employed.

Revo Sol-etern lanterns are made to suit 2, 3 or 4 80 watt 5 ft., or 40 watt 2 ft. fluorescent lamps.



REVO REGD.

REVO ELECTRIC CO. LTD., TIPTON, STAFFS.

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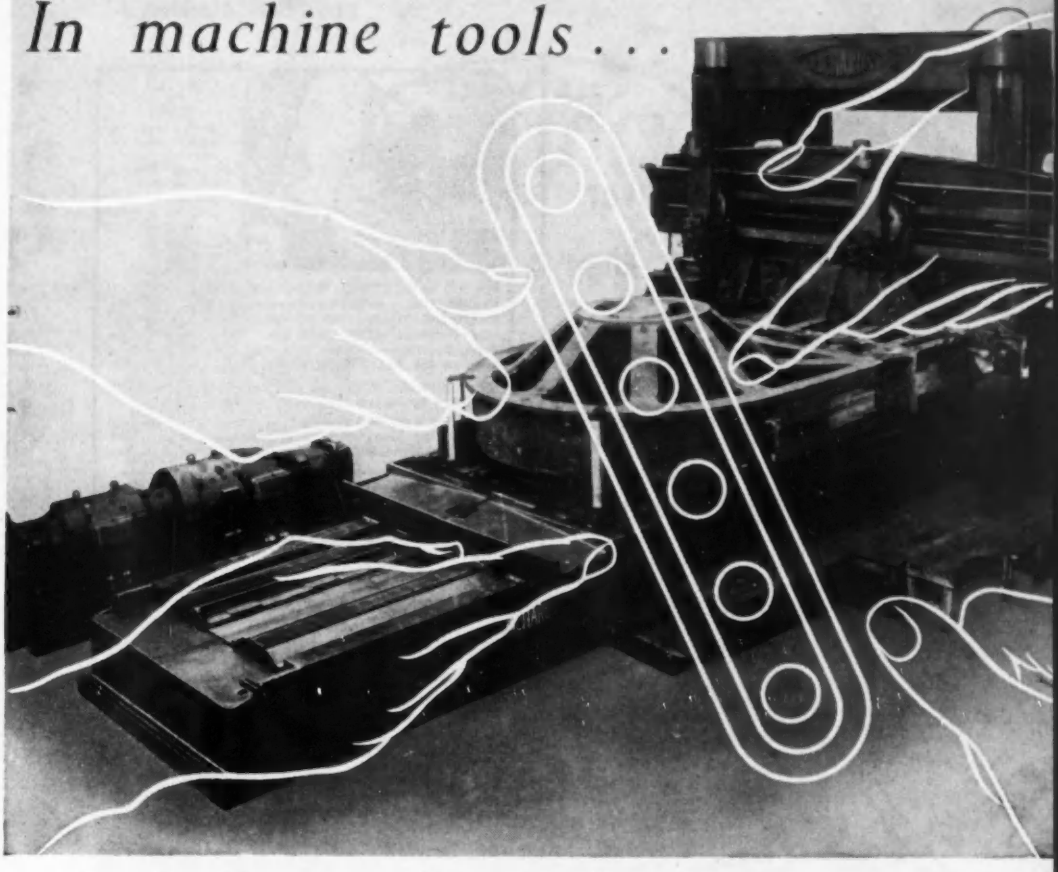

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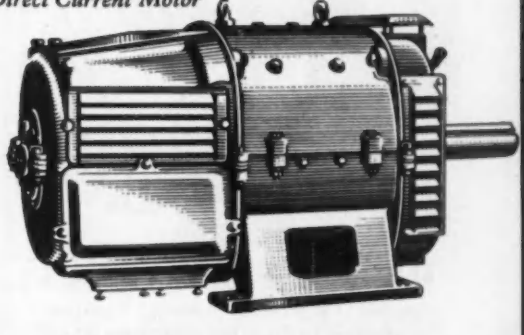
Even in the up-to-date production shop there is room for reducing time-wasting manual labour by thoughtfully applied electrical drives. In the M-V Motor Department are engineers who really understand the electrical problems of the machine-tool industry and their advice is available at the drawing-board stage for new machines or on the conversion of existing equipment.

A typical Metrovic Type "Q" Direct Current Motor



METROPOLITAN-VICKERS ELECTRICAL CO. LTD. · TRAFFORD PARK · MANCHESTER 17

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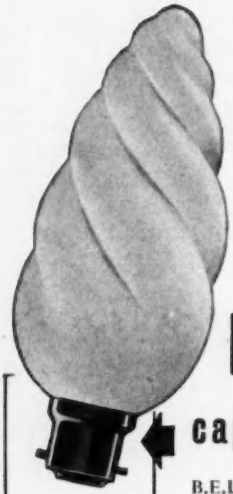
METROVICK *Motors for all Industrial Drives*



Whatever the fitting

B.E.L.L.

caps the lot

B.E.L.L. Decorative Lamps are made in cap-sizes to fit *every* kind of socket—including the small Continental screw-cap. They are all available for immediate delivery in a wide range of styles and finishes, up to 60 watts.

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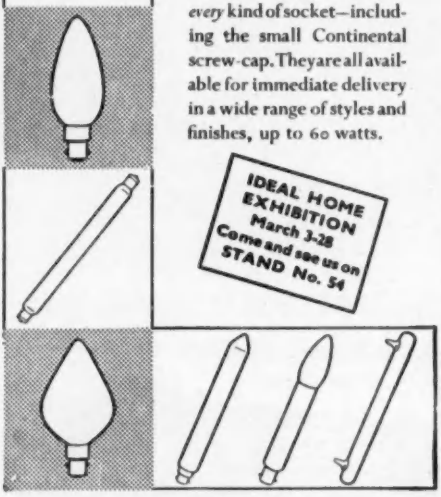

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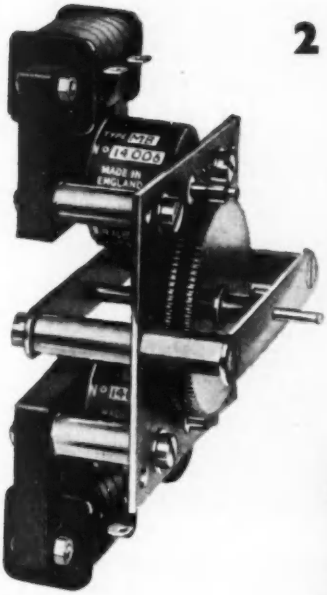
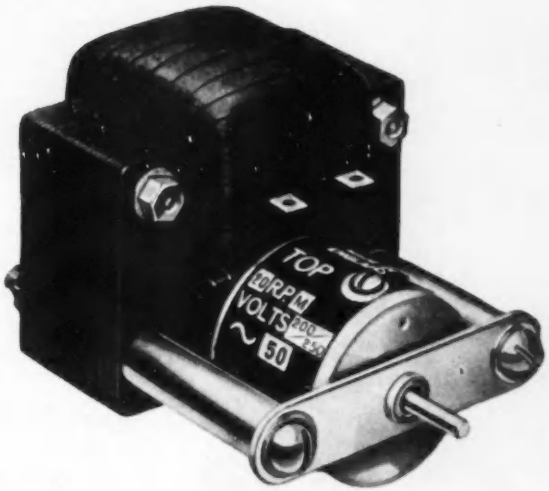
ELECTRIC
SYNCLOCK

2 NEW EXAMPLES



DOUBLE SPEED UNIT. Shaft speed is selected by energising either one or other of the two Synclock motors.
Drive is automatically taken up at the speed desired.
The model shown has speeds of 1 alternatively 10 r.p.m. on a 230 V 50 c/s supply.



HIGH TORQUE (BKS 20) SYNCLOCK MOTOR. Self starting, unidirectional, output 60 gm/cm at 20 r.p.m. on 50 c/s supply.
Synclock products are made for all commercial frequencies and voltages.

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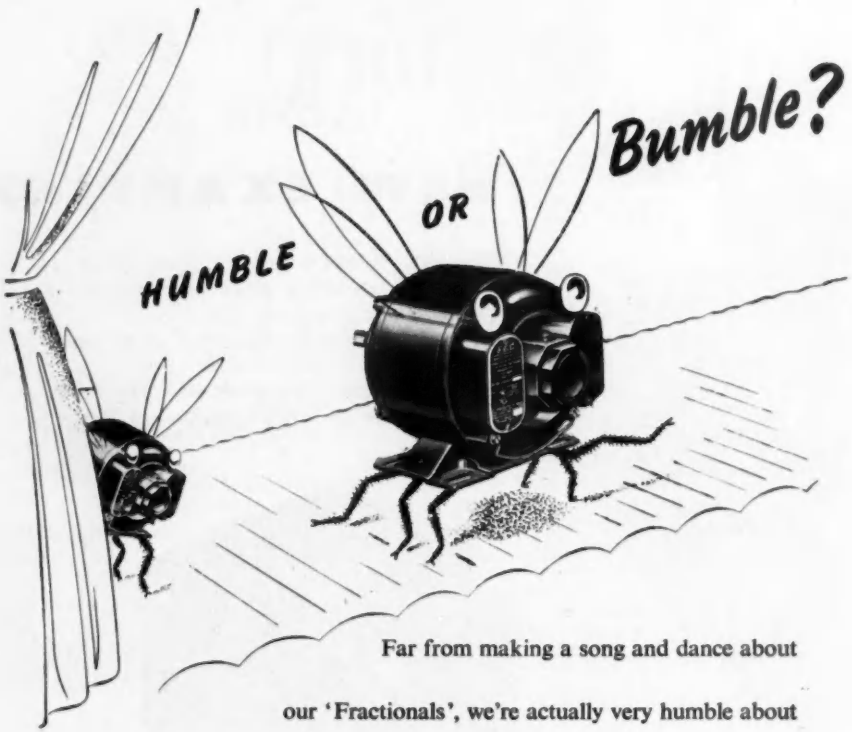

Far from making a song and dance about our 'Fractionals', we're actually very humble about all the nice things said in their praise. And that's no bumble, either! So popular have these busy-bee 'Fractionals' become that if you want to put them on *your* payroll, you had better phone your nearest G.E.C. agent without delay.

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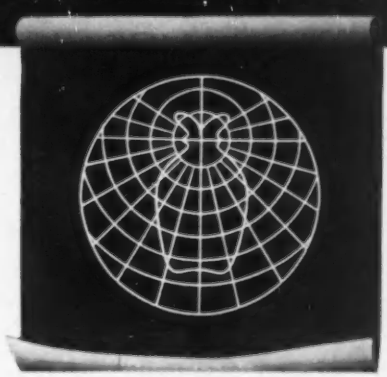

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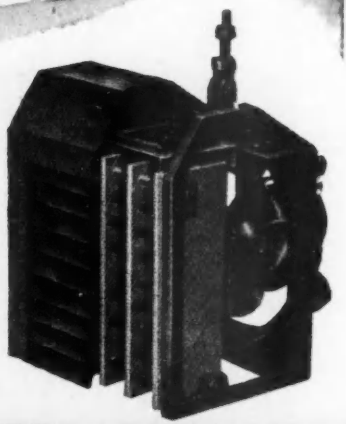

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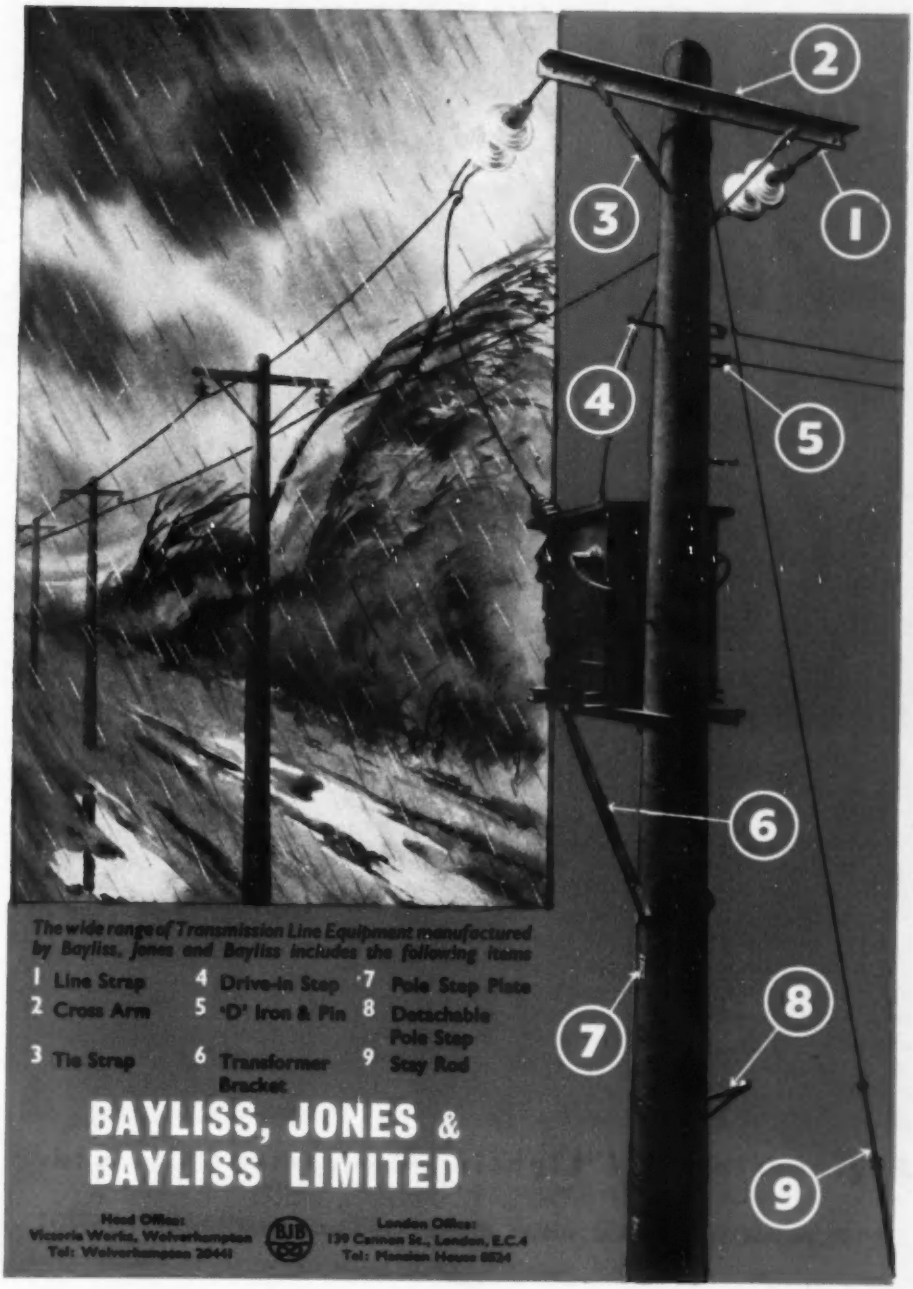

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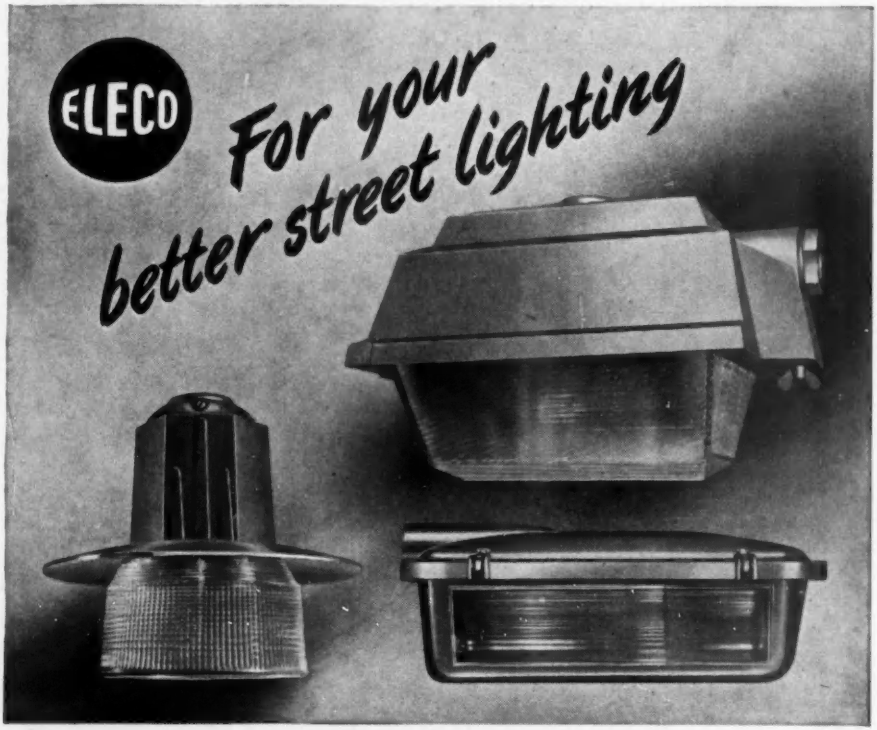

These three fittings are recent additions to the ELECO range of street lighting lanterns and embody all the latest improvements as recommended in B.S. Specification 1788 for lantern construction.

The WELWYN lantern has been re-styled and the refractor springs are totally enclosed to give complete protection against all weather conditions, also giving the interior of the fitting a clean appearance.

The LANCASTER lantern is a controlled cut-off fitting which reduces glare to a minimum. The distribution from the horizontal Mercury discharge lamp in the upper half of the fitting is reflected by means of specially designed reflectors through the scientifically designed refractor bowl giving high and even illumination on the road surface.

The GOLDEN RAY MARK III lantern is completely dustproof and is available for all sizes of sodium discharge lamps. The "Perspex" refractor plates have machined "Perspex" prisms sealed by a special process to the interior of the outer enclosing "Perspex" bowl and because of the unique dustproof qualities of this fitting, maintenance costs are reduced to a minimum.

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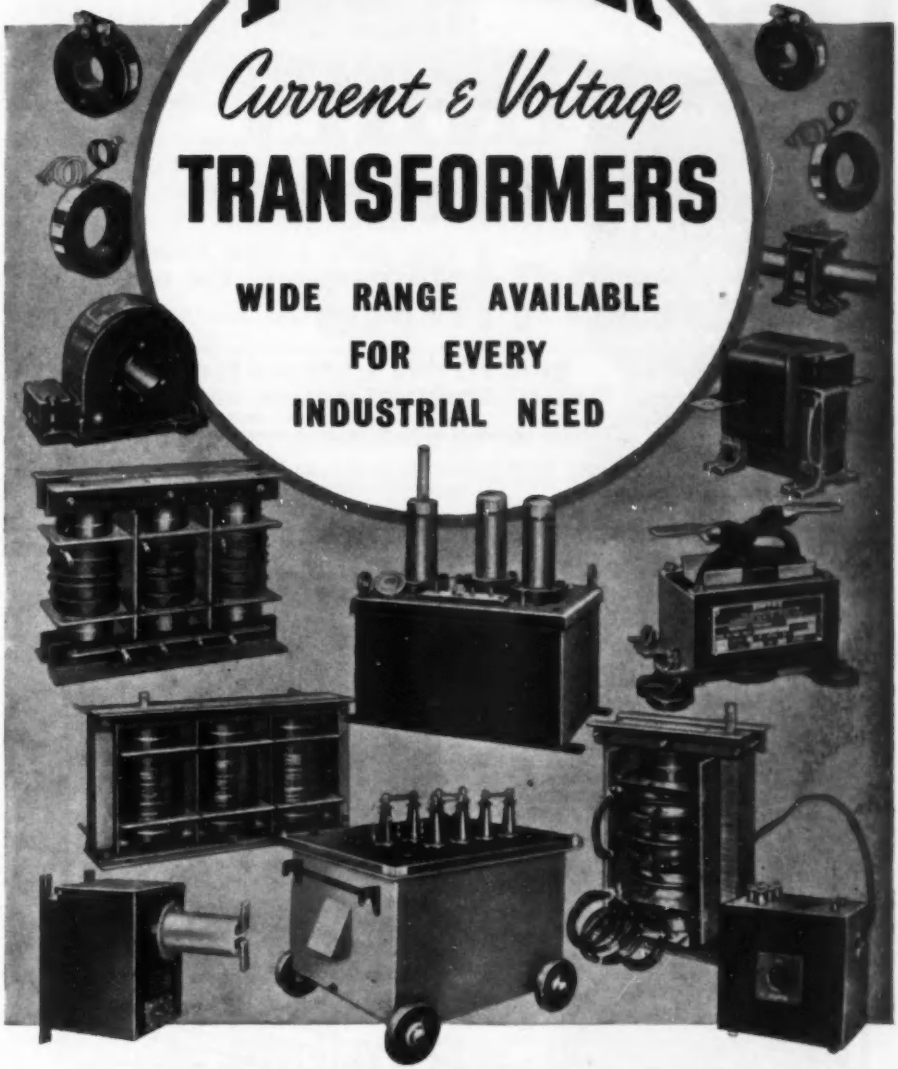

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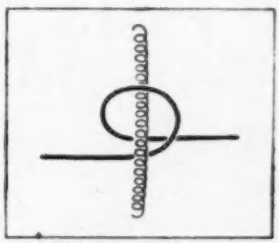
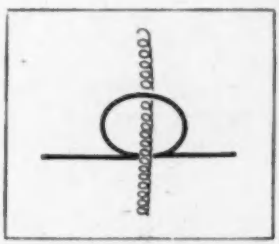


The open loop support of the old method allows several turns of the filament to be short-circuited when the lamp is cap down, thus over-running the filament and shortening its life.



The new method with the closed loop support ensures that none of the filament is short-circuited, whether the lamp is burning with cap up or cap down.

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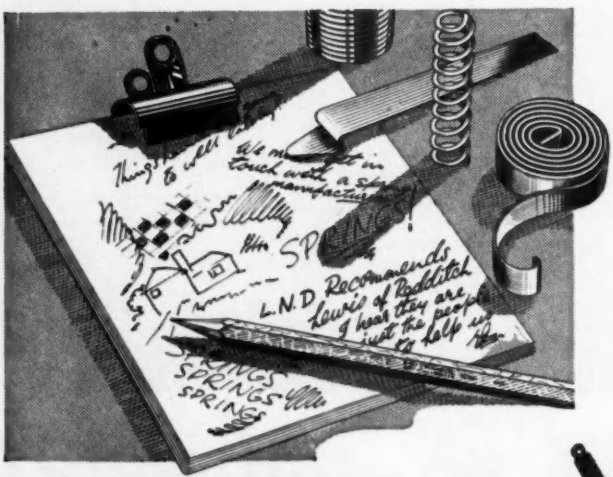

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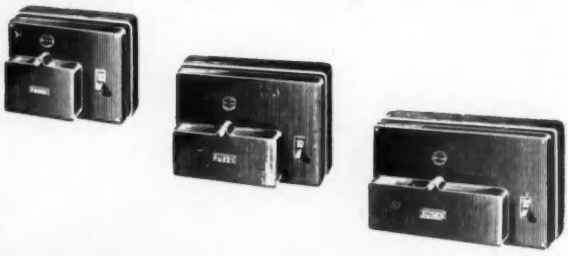
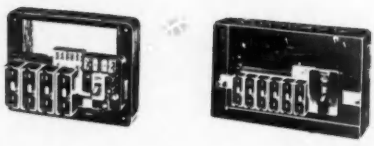
CAPACITY		
4-WAY	✓	
6-WAY	✓	
8-WAY	✓	
MOUNTING		
ALL-INSULATED	✓	
METAL CLAD	✓	
TYPE OF FUSE		
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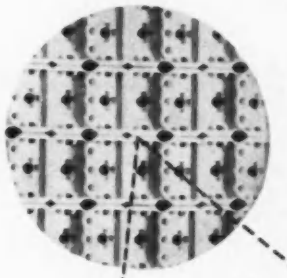

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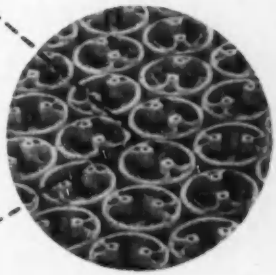

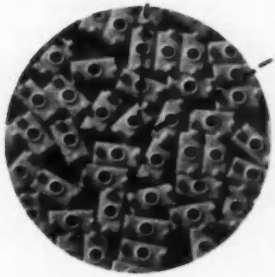

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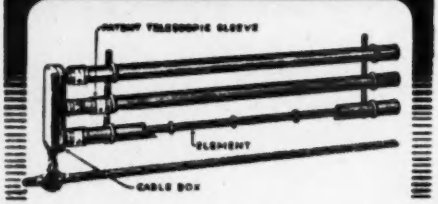

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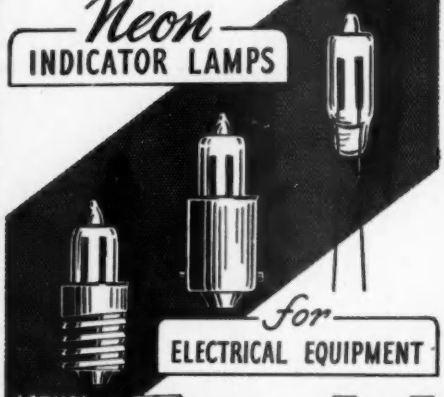

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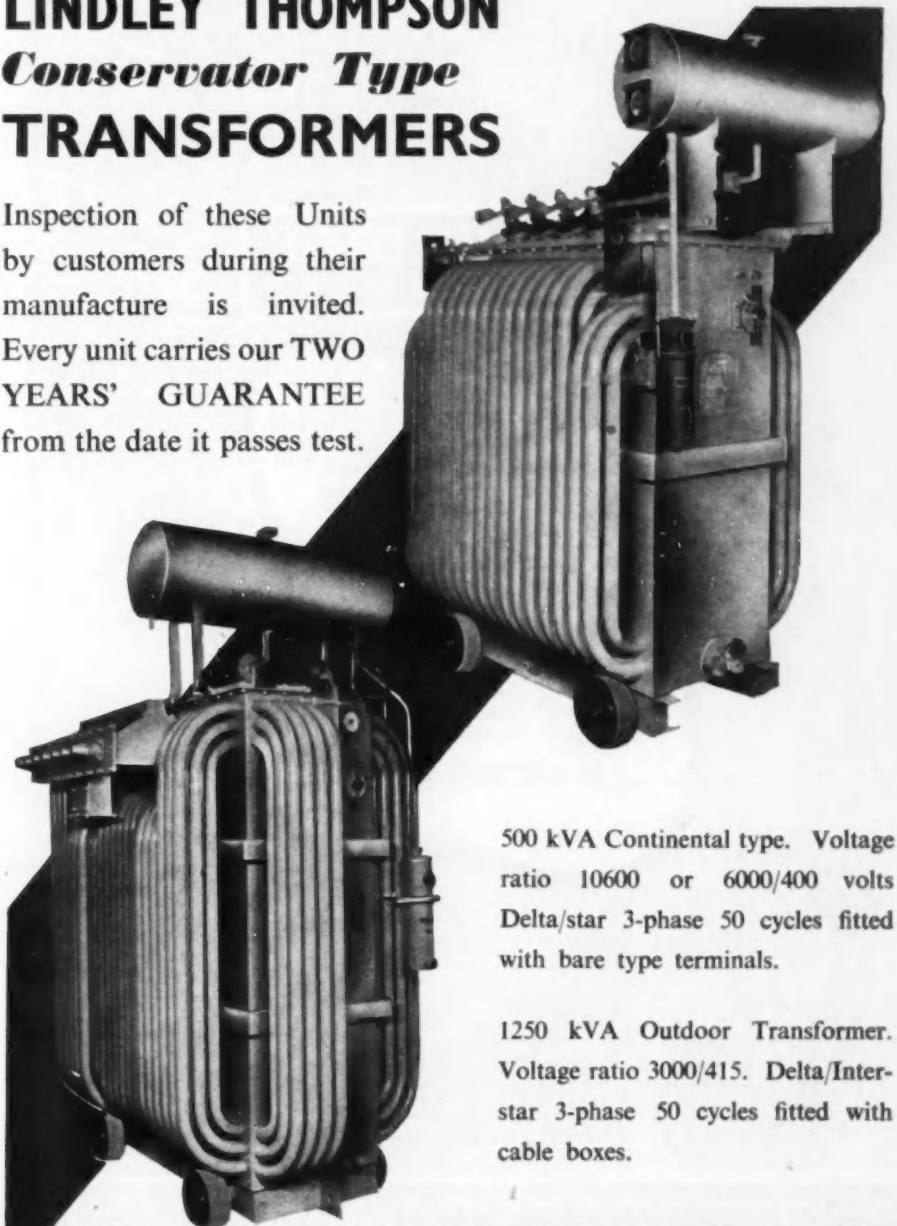

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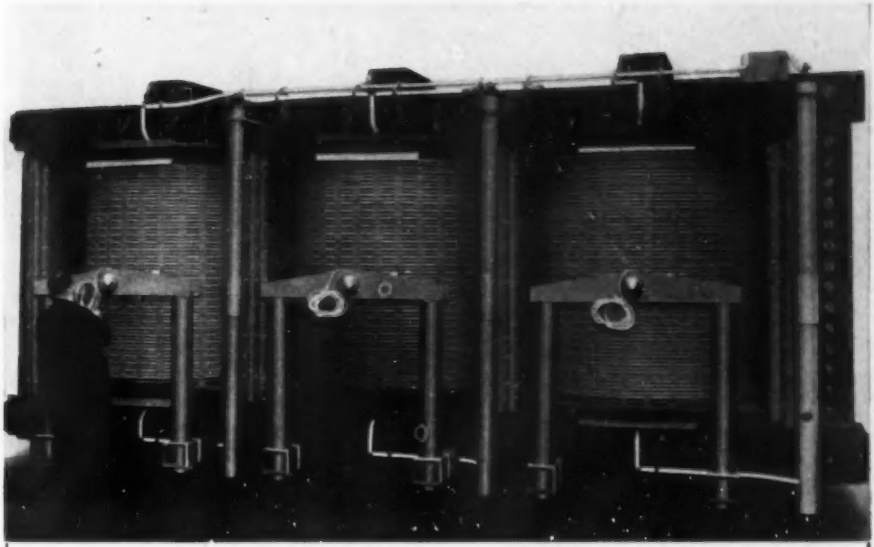

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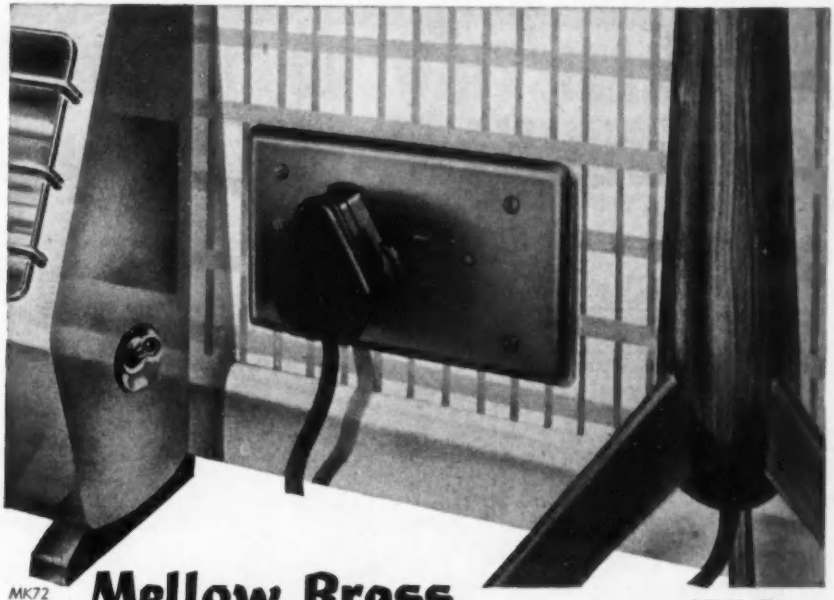

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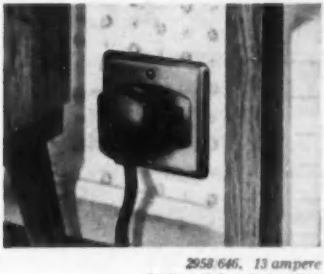

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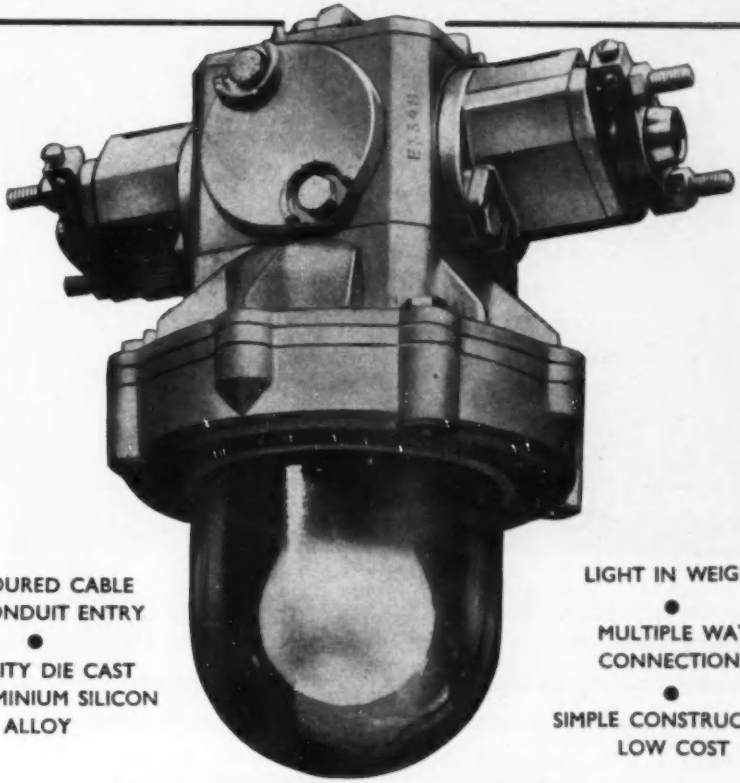

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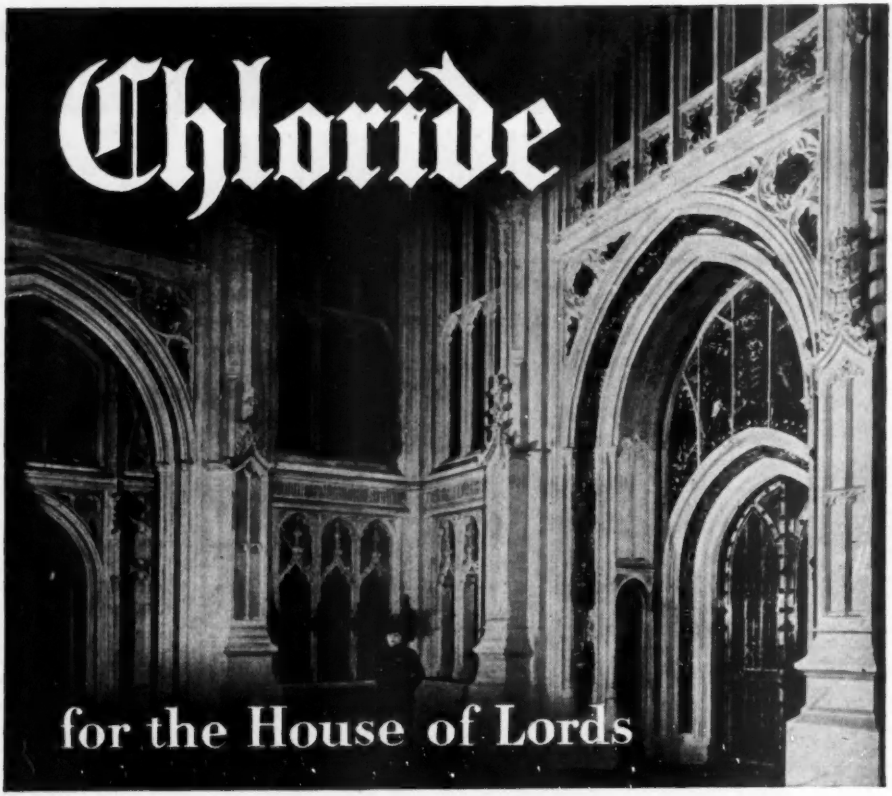

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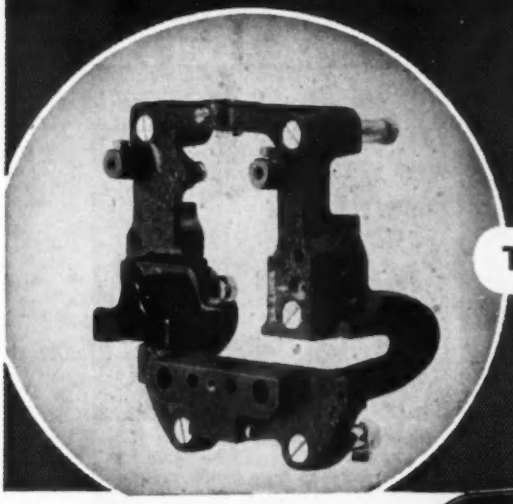

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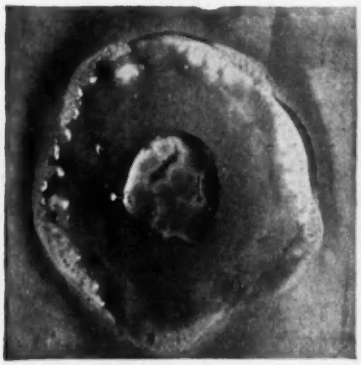

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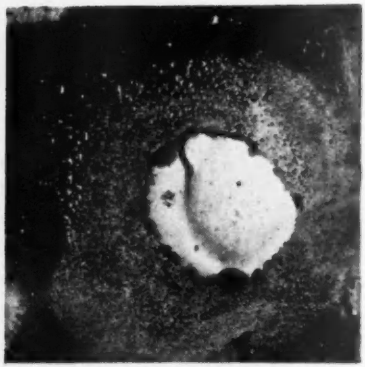
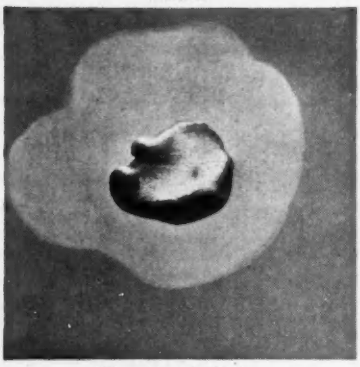
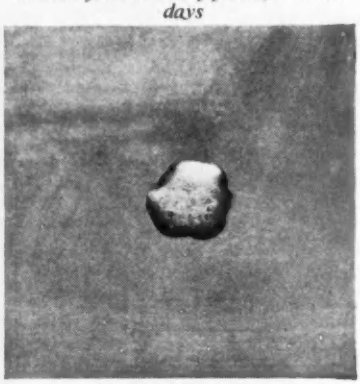


Residue from ordinary flux after three days



Fluxed with Alcho-re



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ELECTRICAL TIMES

Volume 123 No. 3200 5 MARCH, 1953

PUBLISHED EVERY THURSDAY

AN UNUSUAL SYNCHRONOUS CONDENSER 425
OUR READERS' VIEWS 429
THE EDUCATED ENGINEER 430
POWER FROM PEAT 431
HEATING AT HOME 434
NOTES ON WIRING, by Megohm 435
INHERENT ERRORS IN WATTMETER INDICATION
From a Correspondent 436
ANGLO-AMERICAN PRODUCTIVITY SCHEME 438
TESTING BUSHINGS 439
PROBLEMS AND PRACTICE IN ENGINEERING .. 441
FIT FOR IDEAL HOMES 442
THE DARK HISTORY OF ELECTRIC LIGHTING .. 445
OVERSEAS NEWS 446
PERSONALITIES IN THE INDUSTRY 448
NEW LITERATURE 450
A NEW APPROACH IN COOKER DESIGN 451
6,500 h.p. MARINE GAS-TURBINE 452
THE BUYERS' COLUMN 453
BIGGER HOOVER WASHING MACHINE 455
THE WEEK IN NEWS 456
Questions in Parliament 461
Electric Supply News 462
Company Activities 463
COMMERCIAL INFORMATION 464
CLASSIFIED ADVERTISEMENTS 47
INDEX TO ADVERTISERS 56

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Editorial

GAS GETS GOING

IT is now becoming plain what direction the main sales effort of the gas industry will take in the future. At the recent opening of the gas display at the Building Centre the major accent was on water heating, and on that occasion Sir Harold Smith, Chairman of the Gas Council, confined his remarks wholly to this aspect. Next week a Gas Sales and Service Conference is to be opened in London by H.R.H. the Duke of Gloucester at which the major subject will be the domestic water heating load, with a symposium of five papers presented from differing viewpoints. It is perhaps even more significant that not a single one of the papers is concerned with cooking; apparently the position is considered satisfactory in this field. The gas industry was always noted for the vigour of their sales effort: now they are reinforcing their activities and appear to find the continuing restrictions on promotional activity only a limited handicap. It is unfortunate that the same cannot be said for electricity, where the sales effort seems largely ineffective and lacking in direction. Slowly but surely electricity is losing ground in the domestic field for all purposes other than lighting and small power. Gradually it is being forced back from the position that was established in the 1930s. When will the industry awaken to the challenge of its competitors and get into its stride once more?

TWO-SHIFT SAVINGS

AS one result of its recent discussions under the chairmanship of the Minister of Labour, the National Joint Industrial Council has agreed that double-shift working may be an appropriate remedy "where a firm has expensive plant lying idle for the greater part of the 24 hours." Made with reference to manufacturing concerns in general, in furtherance of the Minister's desire to win them from their fixed practice of one-shift working, this definition can in fact hardly be bettered as a description of electricity supply in its present condition, which would be so greatly improved by any extension of industry's working hours. At present extremely costly plant has to be kept on hand to supply a demand that averages only half its peak value, and industrial and other consumers have to pay heavily in consequence. If there were any substantial extension of multiple shift working in industry then this load factor would be improved. A welcome reduction in the resultant unit price of electricity would become possible, both as a result of the spread of capital charges over more purchased energy, and because there would be less need to use comparatively inefficient generating plant to supply peak demands. Unfortunately, this attractive prospect is more than balanced by other factors, with the result that any wide extension of double-shift working is going to be a slow and uncertain business. However, with the impetus given by the Minister, reinforcing the pressure of increasing competition from overseas which is making many firms consider costly re-equipment, perhaps some significant progress can be hoped for.

IMPORTANT ENGINEER

COAL mining today is a job for a team of specialists, amongst whom the electrical engineer has his place. Mr. E. H. Browne, National Coal Board Director-General of Production, gave this opinion in a lecture to the Royal Society of Arts last week, and he followed it with emphasis on a corollary which is still too frequently ignored. In any such team, all the members must have a comparable status if full effectiveness is to be assured. In mining, although the electrical engineer is concerned only with

providing services to facilitate the winning and transport of coal, his opinion in his own sphere of activity must count equally with that of the mining engineer. Only in this way, says Mr. Browne, can engineering standards in collieries be raised, with all that this will mean in terms of economy and safety. How advanced is this attitude, (however ineffective it may be in practice) compared with that of most other industrial managements! All too often the electrical engineer or technician in firm or factory is thought of as available to put matters right: too seldom as on hand with advice and experience that can improve efficiency and can prevent breakdowns by prior planning. The problem is accurately summed up in one word—status. Given his deserved standing in an organisation, the specialist engineer can effectively increase its efficiency. Treat him as a necessary nuisance, and a most valuable opportunity is lost.

POWER FOR WALES

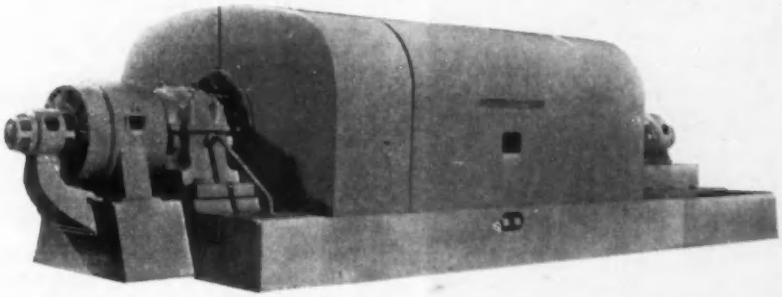
POSSESSION of a sovereign electricity authority seems to be essential to national self-respect today. With the idea of a pan-Scottish board established as at least a political possibility, there is now increasing pressure from Welsh sources for an independent body to organise and control generation and distribution in the Principality. At present this demand is being fostered mainly by the local authorities concerned, though just what improvement they expect to be gained from such a reorganisation is far from clear. Judging from some observations offered recently by the Caernarvonshire County Council, which has been active in this movement, even the sponsors seem to have treated the question of practical advantage somewhat superficially. They expect the low cost of generation in South Wales to be spread throughout the whole country, with consequent benefit to those areas now served by the Merseyside board; and they look for faster progress in the electrification of rural areas so important to Welsh economy. Yet such hopes are surely doomed to disappointment. With Wales as a whole importing electricity, costs would still work out at above the South Wales level while, so far as rural electrification is concerned, the controlling factor would remain the permitted rate of capital investment, a variable controlled from Whitehall rather than Winsley Street. Moreover, there is considerable geographical justification for the present split and an all-Welsh organisation might find itself in considerable need of English wayleaves. Apart from slaking the thirst of national pride, a Welsh Electricity Authority offers few advantages to compensate the complications and duplication that separation from the B.E.A. would involve.

MEGAVARS GO ABROAD

THE description on a later page of the largest high-speed synchronous condenser yet to be manufactured in this country is a reminder that such machines have never found much application here, although they are a common adjunct to long-distance transmission overseas. The reason for this apparent difference is not far to seek: there is at present no transmission system in Britain which is "long-distance" by world standards. On the 132 kV Grid, lines are generally short and stations tightly interconnected, so that the facilities of voltage control and local generation of wattless current given by the synchronous condenser are not needed. Only in such exceptional conditions as those created by plant shortage has occasion been found to use synchronous condensers, and improvisation has answered this need, as at Ocker Hill and Dunston, where alternators have been run uncoupled from their turbines. In the next five years, however, the commissioning of the initial sections of the 275 kV superimposed Grid, involving one-way transmission over 120 miles or so, may mean that synchronous condensers will at last come regularly into operation in this country. If their use is decided upon, there is no lack of experience in this country in the design and manufacture of these machines for the most onerous duties.

Meteor

AN UNUSUAL SYNCHRONOUS CONDENSER



New 40 MVA Set can be Dismantled Using a 3-ton Crane

THE operation of long transmission lines at high voltages introduces considerable problems of stability, regulation and operation, and it has now become common practice, particularly on systems abroad (where a close interconnected network such as the British Grid is a rarity) to introduce synchronous condensers. By the use of automatic voltage regulators, to control the excitation of these machines, the power factor may be adjusted at various conditions of load, and the voltage regulation at the receiving end held constant.

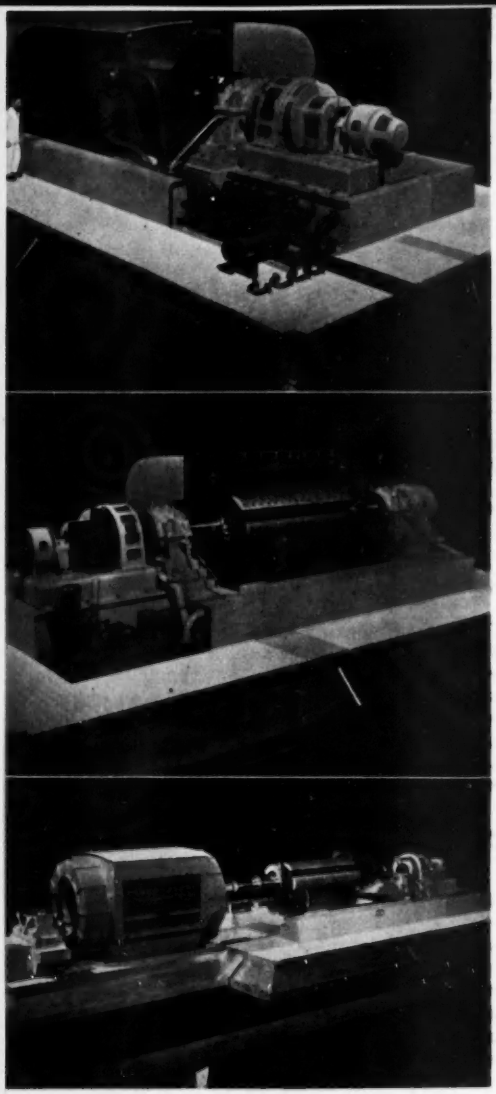
One system, now being built, where the synchronous condenser can operate to maximum advantage, is in the State of Victoria, Australia, where the Electricity Commission is erecting a large 220 kV network. The project embodies three major lines in series. One is to run from Mildura to Kiewa via Swan Hill and Shepparton, and has an overall length of 350 miles. The second is from Kiewa to Melbourne (receiving station, Malvern) and is 150 miles long, while the third runs from Malvern to Yallourn. The main generating points are Kiewa, which comprises an extensive system of hydro-electric stations, Melbourne area, where there are several steam plants, and Yallourn. Peak-load diesel stations are projected for Mildura, Swan Hill and Shepparton. In view, therefore, of the long distances involved, the decision was taken to install a 40 MVA synchronous condenser at Malvern, and this machine has been built by the Metropolitan Vickers Electrical Co., at Trafford Park.

The design of the machine follows, generally, that of the company's normal product, although its size is somewhat greater than any yet built in this country. Several points of interest are, however, introduced, due to site requirements, and a number of recent developments—which will subsequently apply to all Metrovick designs for salient pole machines—have been incorporated.

Site Requirements

Starting with the site requirements, it was decided, in the interest of economy, to avoid as far as possible the necessity for a basement, and in view of the low external torque forces, to simplify as far as possible the foundations. A further requirement was that the machine should be capable of being completely dismantled and erected with the use of a crane with a maximum capacity of three tons.

Electrically, the machine was to be capable of supplying 40 MVA positive (over-excited condition), 25 MVA negative (under-excited), and should be capable of supplying charging current to an unloaded 220 kV line so that the line could be synchronised at the transmitting end without the introduction of voltage transients and surges. This was partially a consequence of the necessity to keep system stability, particularly in view of the hydro-electric generators at Kiewa, with their unavoidable governing difficulties. The consequence of this latter requirement is that the condenser must, under certain circumstances, be powered from an outside prime mover, and for this reason a driving motor has been introduced.



The model on the left shows at top, the arrangement of air coolers, in centre the rotor and the stator (sectioned) with the oil tank and pumps, and finally the machine completely disassembled for inspection

Rotor Construction

The rotor is of the solid-pole type, extensively developed by the company for high-speed salient pole machines. The rotor body itself consists of a solid steel casting, centrally bored for internal examination and inspection and machined to give the six rectangular poles. The length of the rotor may appear somewhat long for this type of machine, but this is in accordance with the company's practice of reducing the diameter as far as possible to minimise windage losses—which form a major part of all the losses—and also to reduce centrifugal forces which reach a great value at the unusually high speed of 1,000 r.p.m. The shaped pole shoes, which also serve to hold in the windings, are secured to the poles by a large number of high-tensile bolts.

Lateral movement of the field windings is prevented by the introduction of steel "V" wedges which are anchored from radial movements by being dovetailed into a slot milled along the length of the rotor body, and which bear up against the sides of the windings through insulating packing pieces.

The stub shafts, which carry the integral fans, the bearing journals, sliprings (which are both on one shaft), and the coupling flanges are remarkably large in diameter, considering they carry virtually no torque, but this is due to the necessity for keeping the machine well away from any critical speeds. These shafts are bolted through flanges on to the rotor body.

Field coils are of the rectangular "fabricated" type, built up from side and end bars, with a dovetailed brazed joint at each corner. To aid cooling, each fifth bar has been made wider than the others so that it projects to give a fin. Where the locking pieces come, these fins are, of course, removed to give a flat surface. Adjacent bars are separated by asbestos paper, bonded with a thermal hardening varnish and solidified under heavy pressure. The insulation between the pole pieces and the field coils consists of hard, flat sheets of bakelite-bonded fibreglass board, with thick collars of bakelised fabric board at top and bottom. It is interesting to note that at 15% overspeed, the centrifugal force (or possibly, more accurately, the centrifugal acceleration) in a rotor of this size, rises to 1,000 g. The two fans, located at either end of the rotor, have blades of cast aluminium alloy. Overall the rotor weighs some 61 tons.

Stator Design

The stator, which weighs 54 tons, generally follows established practice with a fabricated steel-plate body carrying the core and windings. The core itself is built up of silicon-alloy segmental stampings of the straight-back form with non-magnetic tooth supports and vent spacers. Owing to the unusually high voltage, the winding is of considerable interest, and is of the two-layer type (all coils identical), with formed involute ends, clamped by brass bolts and plates to angle brackets of compressed hardwood. The individual strips of the

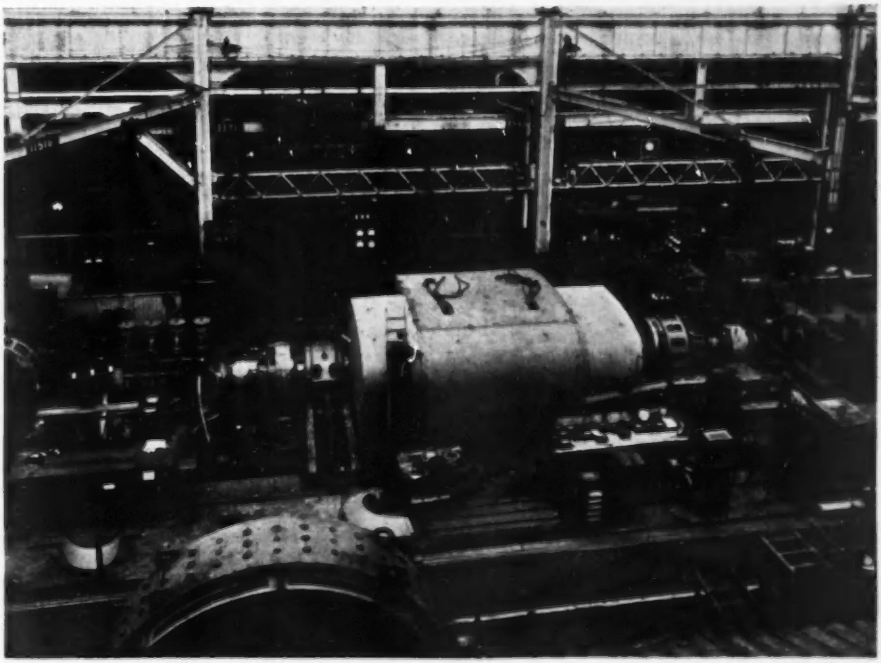
laminated conductor and the complete coil are insulated throughout with mica-silk tape, vacuum-dried and impregnated in bitumen. To facilitate insertion or removal without distortion the coils are made in "halves," being jointed by butt-welding at each end.

Owing to the site requirements, the air coolers are mounted on each side of the stator and can be readily removed when it is required to take down the machine. The rated current in the stator, under full operating conditions, with full cooling, is 1,050 amps per phase and the temperature rise is in accordance with B.S. 226 for Class "B" insulation. Total losses, are less than 800 kW (2% of the kVA).

Auxiliary Machines

As mentioned before, a driving motor of the synchronous induction type, having the same number of poles as the condenser, is rigidly connected through a non-flexible coupling to one of the stub shafts, and although the condenser would be inherently self-starting, this equipment allows it to be used for charging and synchronising an unloaded transmission line. The motor starts as a slipring induction motor on an external resistance, and when it reaches 98% of full speed, d.c. excitation is applied to the rotor to bring the set into synchronism with the supply. The motor is, however, powered from a 2·2 kV supply which, in turn, is connected to the 22 kV busbars to which the condenser is connected by transformers which have a 30° (electrical) displacement. In order, therefore, to ensure accurate synchronisation, it is necessary to provide means for adjusting the phase angle difference between the motor and the condenser to compensate both for transformer phase displacement and the motor load angle. The latter could have been calculated, but in view of the difficulty of machining keyways and coupling bolt positions to the small angular tolerances which would be necessary, and the difficulty of rocking the stator on a machine of this size, together with the dismantling requirements, it was decided to use an electrical adjustment. Accordingly a tapped resistance has been introduced, connected across the outside of two of the phases in the starting motor rotor winding, and the exciting d.c. for the motor will be fed in from a tapping point which has been found by experiment in the works. Adjustment of this tapping point enables a variation of ±18°

Below is shown the set on the test bed at the Trafford Works, Manchester



(electrical) to be introduced between the motor and the condenser, and if it is found necessary, further variation can be introduced by displacement of shafts at the coupling or by alterations in the connections of the machines. The driving motor itself is rated at 1,160 h.p., 2·2 kV, and it carries its own overhung exciter, rated at 54 V, 660 amps.

The condenser itself, of course, requires excitation, and at the opposite end of the machine two further generators are fitted on an independent bed-plate. These consist of a pilot exciter rated at 230 V, 28 amps, which controls the field of the main exciter. The latter has a continuous rating of 200 V 575 amps, but for super-excitation can give a peak output of 370 V, 1,050 amps. A differential field winding is included to give a voltage variation of 10 to 1 to cover the range of output of the condenser.

An essential feature of the design is that the whole set is mounted on a raised plinth of concrete some 30 in. high, which brings the stator frame wholly above floor-level. Thus, no major excavation for the foundations is required, and the stator and rotor can be removed on rollers, with the aid of jacks. The joints between adjacent covers of the stator are so arranged that any one section can be removed without disturbing the others. Removal of either side cover gives access to one of the air coolers and to its cooling-water inlet and outlet valves, and removal of one half of either end-cover exposes the inner winding guard carrying the fan shrouding ring and the inner shaft cover.

Dismantling the Machine

The dismantling of the machine is carried out by means of four hydraulic jacks, packing blocks and baulks, tackle, and a three-ton crane, (the crane at Malvern has, in fact, a seven-ton lift to cope with other plant in the station). In the design, the main bearing at the driving motor end stands on the closed end of the concrete plinth, but that at the exciter end is carried on a transverse welded steel assembly which can be moved in an axial direction on skid plates. The first step is to uncouple and remove the auxiliary and main exciters. An extension shaft is then bolted to the main shaft at the coupling, and all enclosing covers, including the fan shrouding rings, are removed. The bearing keeps and top shells are then removed and timbers and packing are placed to a convenient height below the end of the extension shaft. A special shaft lifting-piece is then placed between the extension shaft and two 20-ton jacks which rest on the timbers, and the shaft is lifted sufficiently to clear the lower bearing shell which is then removed.

The bearing girder and the bottom half of the bearing casting can be moved outward sufficiently far to clear the journal. A second set of timbers and baulks is then built up under the journal, and by letting down the outboard jacks the load is taken from the supports under the extension shaft. These are then removed and the bearing pedestal and supporting girder can be completely withdrawn clear of the machine. The oil coolers are then removed and the stator is lifted slightly with the four jacks on one side. Roller assemblies running on specially prepared tracks are inserted beneath the stator foot. The same process is then applied to the other side, leaving the stator, with the rotor still in the bore, supported on the roller assemblies. The jacks can then be removed and two of them used to take the rotor load again at the end of the extension shaft, while the packing under the journal is removed. The clearance thus obtained allows the stator to be rolled sufficiently far along the tracks to expose the centre of the rotor.

The driving motor is now uncoupled from the main shaft and the complete motor assembly on its bed-plate is pulled back sufficiently to allow a small lifting beam to be bolted to the main shaft. Two jacks are used in conjunction with this beam to raise the shaft clear of the bearing when the lower shell can be removed from the pedestal. A cradle is then assembled, complete with a wheeled truck on rails, under the centre of the rotor and the rotor lowered at both ends on to the cradle. All the jacks and packing can then be removed and the stator completely withdrawn on its tracks to clear the rotor, which can also be moved axially on its trolley (see the illustrations on page 426).

Lubrication

In a set of this nature, where long-term, trouble-free running is vital, lubrication is of prime importance, and the only excavation of any size required on site is for the lubricating oil tank at the starting motor end. This tank contains two motor-driven low-pressure oil pumps, each 100% duty, to feed the two main bearings. Either may be in operation, with the other as automatically-operated standby. A third high-pressure pump is provided for starting purposes.

Thanks are due to the Metropolitan-Vickers Electrical Co., Ltd., and to the State Electricity Commission of Victoria for the opportunity to examine the set and for the above information.

Our readers' views . . .

The Fraud of Solid Fuel

THE above article interests me because for the last two winters I have changed over from an old boiler and fires supplemented by electric heating to a modern boiler with radiators and an "improved" grate with no electric topping-up. There has been a marked gain in comfort and a saving in cost, and an overall improvement in efficiency.

There are two good reasons for using the "improved" grate:—(1) a saving of labour and dust, and (2) the continuous burning feature gives heat during the night when the outside temperature is lowest and the house closed so that the heat is retained.

Electrical space heating will never be economical (and, therefore, popular) until a reduced night tariff becomes general and the public are educated to use real storage heaters or convectors with a low night rating.

W. J. Nicholls

DORKING, SURREY

I THOUGHT it was now generally agreed that all this talk about solid fuel efficiencies was just a smoke screen to try to hide from the public the fact that the encouragement given to the continuous burning of bituminous coal, particularly in domestic grates, is nothing less than a national disgrace. Whatever temporary increase in burning efficiency there may be, it is vitiated by the extra cost on labour and fuel required to deal with the smoke, tar and other dirt which this antiquated method produces.

Mr. Barfield may revel in soot and dust, but his neighbours may not see eye to eye with him in this. That is if they are able to use their eyes at all after he has finished with them.

Mr. Bellingham says that the householder does not worry about calorific values but is generally only interested in the size of his fuel bill (would he include cost of cleaning and chimney sweeping?), but how much less would the nation's fuel bill be if the amount of domestic smoke sent into the atmosphere could be cut by even one half.

Let's face it. Three thousand fellow human beings are reported to have died as a result of the recent man-made London fog horror and something must be done to prevent this happening again. It is quite possible that similar atmospheric conditions may occur next year and, surely, someone must shoulder the responsibility if the same toll is taken. Just think again, ye advocates of bituminous coal—3,000 lives. What value in £ s. d. do you place on a human life?

What can be done? Stop advertising the open-type domestic grates. Stop telling people to burn them all night. Concentrate on making more smokeless fuel and selling more efficient stoves and boilers to burn it in.

Encourage the general use of electric storage heaters and the use of electric fires and convectors in the spring, summer and autumn and take the tax off electric water heaters.

Three thousand lives—it is serious.

R. E. Gamlen

BRIGHTON, SUSSEX

MR. LOGAN says that for the cost of my 27 lb. of coal I can buy 17 units of electricity and have a nice warm room. He doesn't know the room ! It has four doors and a window the whole length of one wall, and 1 kW fire on continuously in winter does little more than prevent acute frost-bite.

He also says that by using 17 units of electricity I should save 10 lb. of fuel. Since when has the B.E.A. been able to deliver one unit in these remote parts, or indeed in any other, for 1 lb. of coal?

There is a further advantage of coal, hitherto unmentioned. My Electricity Board sends me a notice, less than four weeks from date of invoice, threatening to disconnect supply. My coal merchant is not nearly so pressing.

T. J. Barfield

ROBERTSBRIDGE, SUSSEX

• • •

Purchase Tax

MANY traders will have again suffered loss due to the reduction of purchase tax in relation to a reduced price for washing machines.

We hope all such traders will write at once to their Members of Parliament and urge that provision be made for compensation for such losses.

H. A. Taylor

BECCLES

The Educated Engineer

Lord Cherwell considers Technological Training at I.E.E. Annual Dinner

ONCE again the Annual Dinner of the Institution of Electrical Engineers has provided one of the largest electrical gatherings of the year. More than 1,200 members and guests of the Institution were present last Thursday at Grosvenor House, when this impressive function was held under the chairmanship of Col. B. H. Leeson, the President.

Principal guest of the evening was the Rt. Hon. Lord Cherwell, P.C., F.R.S., the Paymaster General, who proposed the toast of the Institution. After recalling the remarks last year of the Archbishop of Canterbury on the corresponding occasion, he went into an attack on "arts people," who thought that there is nothing shameful about being ignorant of scientific matters. He considered scientists and engineers to have a broader education than those who studied arts subjects. The applied scientist was not content to deal in words; he managed things.

U.S. Productivity

We were often told that U.S. productivity was greater than in this country because the Americans had three times the horsepower. The basic reason was that the Americans were left more profit to plough back into industry. Double shift working was another important factor. If we could work double shifts, we would use up machinery quickly, but this would have the advantage that we would have machinery that was always up-to-date.

In the export field the electrical industry had been achieving considerable success, becoming increasingly important relative to other industries.

Turning to the question of education, Lord Cherwell said that the industry needed more recruits and more and better training. The technological university might help; he thought it rather scandalous that we had no such institution. Young men must be encouraged to join the engineering profession. Technical progress had been and would still be great: the fuel cell, for instance, offered high hopes of increasing the efficiency of generation and of abandoning all the difficult problems of using low temperature heat.

Replying for the Institution, Col. Leeson said that the lifeblood of the I.E.E. was knowledge and good fellowship. It was this latter quality that permitted such a good relationship to exist between private manufacturing concerns and the nationalised industries.

Expanding Industry

More than 900,000 people were engaged in the electrical industry, and this number was growing by 15,000 every year. Because of this intake the industry was very keen on education at every level, particularly in regard to technical colleges. Technological universities had their points, but recently visits had been received from countries having such institutions, whose authorities were impressed by the breadth of education which our engineers received. It was this broad basis of education which enabled British engineers to pioneer so successfully.

So far as trade was concerned, it seemed probable that engineering products would be the basic exports of the future. Already they comprised more than 50% of total visible exports, and the electrical industry's contribution was not far behind that of the automobile manufacturers. What was more, it was going to increase in proportion.

In conclusion, Col. Leeson stressed the point that for national prosperity it was necessary to make better use of existing resources. There was, in particular, a need for longer working hours; in fact, the challenge of the times was for more human effort in every way.

Sampling the Guests

Col. Leeson was followed by Sir John Hacking, who made use of what he described as a B.S. sampling method to deal with the toast of "The Guests." In the course of this speech he made special reference to the presence of Sir Harry Railing, the most recently elected honorary member of the Institution.

A witty reply on behalf of the guests came from the Rt. Hon. Lord Webb-Johnson, the eminent surgeon. In the course of remarks which proved well to the liking of his audience, he paid tribute to the many ways in which the work of electrical engineers had aided surgeons.

POWER FROM PEAT

Gas Turbine Developments include a Standard Line of 1,000 kW sets and a Unit fired with Solid Fuel

The illustration above shows "fluidised" peat flowing from a pipe

SOME time ago, January 19, 1950, we published a description of the Ruston 750 kW gas turbine unit which had been installed in the Company's power station at their Lincoln works. The machine, which has now completed over 3,000 hours running on a variety of fuels, has provided data and experience which have resulted in the development of a standard unit, the 750/1,000 kW Mark TA gas turbine. This design, which is being batch-produced in Lincoln, consists of two self-contained units; the gas-generator (consisting of the compressor and compressor turbine), and the power turbine and gearbox. "Vertebrate" construction has been used, whereby the rotors and stators of the compressor and turbines are located relative to each other by short internal structural paths and not through the bedplate. Normal installations can, by this system, be rapidly erected, and in "transportable" applications, no damage can arise even if the plant is supported unevenly.

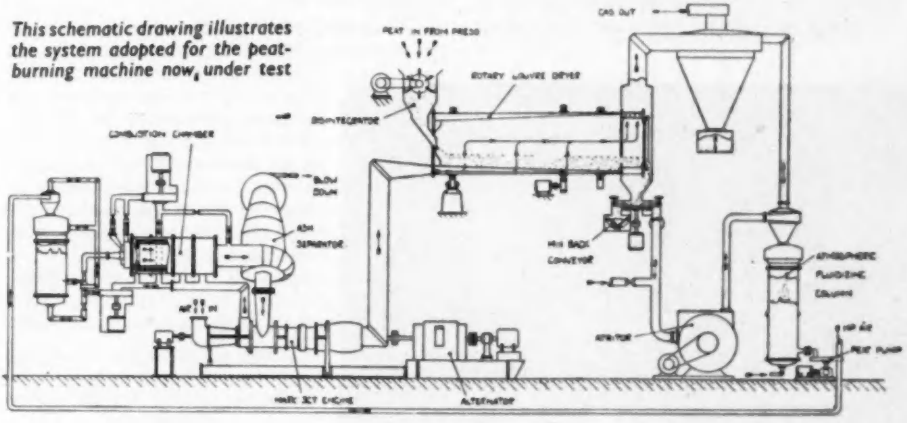
The standard epicyclic gearbox has been arranged to provide different output speeds including 1,800 and 1,500 r.p.m., to make the set suitable for 60 and 50 c/s alternators. A direct drive at 6,000 r.p.m. can also be obtained for driving rotary air or gas compressors.

A special shop has now been equipped at Lincoln to deal exclusively with the manufacture of the rotors, casings and blades of this standard type of turbine, and the system of production is such that an output of over one machine/week may be attained if necessary.

Design Alterations

The main developments embodied in the TA machines lie in the combustion chamber and the ducting arrangements. The former can operate on a variety of boiler oils including Admiralty Reference fuels "Mothball" and "Tarmac." Unfortunately these oils are somewhat rich in vanadium with resultant erosion and deposit troubles on the turbine blading. Work is, however, being carried out on this problem and it is hoped that a partial solution may be found by the injection into the

This schematic drawing illustrates the system adopted for the peat-burning machine now under test



The Educated Engineer

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Principal guest of the evening was the Rt. Hon. Lord Cherwell, P.C., F.R.S., the Paymaster General, who proposed the toast of the Institution. After recalling the remarks last year of the Archbishop of Canterbury on the corresponding occasion, he went into an attack on "arts people," who thought that there is nothing shameful about being ignorant of scientific matters. He considered scientists and engineers to have a broader education than those who studied arts subjects. The applied scientist was not content to deal in words; he managed things.

U.S. Productivity

We were often told that U.S. productivity was greater than in this country because the Americans had three times the horsepower. The basic reason was that the Americans were left more profit to plough back into industry. Double shift working was another important factor. If we could work double shifts, we would use up machinery quickly, but this would have the advantage that we would have machinery that was always up-to-date.

In the export field the electrical industry had been achieving considerable success, becoming increasingly important relative to other industries.

Turning to the question of education, Lord Cherwell said that the industry needed more recruits and more and better training. The technological university might help; he thought it rather scandalous that we had no such institution. Young men must be encouraged to join the engineering profession. Technical progress had been and would still be great: the fuel cell, for instance, offered high hopes of increasing the efficiency of generation and of abandoning all the difficult problems of using low temperature heat.

Replying for the Institution, Col. Leeson said that the lifeblood of the I.E.E. was knowledge and good fellowship. It was this latter quality that permitted such a good relationship to exist between private manufacturing concerns and the nationalised industries.

Expanding Industry

More than 900,000 people were engaged in the electrical industry, and this number was growing by 15,000 every year. Because of this intake the industry was very keen on education at every level, particularly in regard to technical colleges. Technological universities had their points, but recently visits had been received from countries having such institutions, whose authorities were impressed by the breadth of education which our engineers received. It was this broad basis of education which enabled British engineers to pioneer so successfully.

So far as trade was concerned, it seemed probable that engineering products would be the basic exports of the future. Already they comprised more than 50% of total visible exports, and the electrical industry's contribution was not far behind that of the automobile manufacturers. What was more, it was going to increase in proportion.

In conclusion, Col. Leeson stressed the point that for national prosperity it was necessary to make better use of existing resources. There was, in particular, a need for longer working hours; in fact, the challenge of the times was for more human effort in every way.

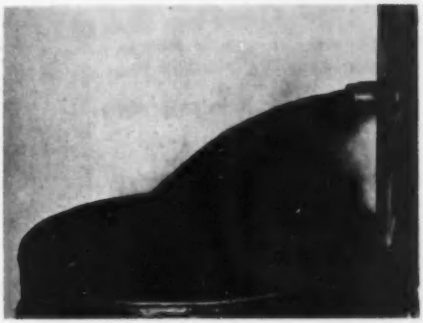
Sampling the Guests

Col. Leeson was followed by Sir John Hacking, who made use of what he described as a B.S. sampling method to deal with the toast of "The Guests." In the course of this speech he made special reference to the presence of Sir Harry Railing, the most recently elected honorary member of the Institution.

A witty reply on behalf of the guests came from the Rt. Hon. Lord Webb-Johnson, the eminent surgeon. In the course of remarks which proved well to the liking of his audience, he paid tribute to the many ways in which the work of electrical engineers had aided surgeons.

POWER FROM PEAT

Gas Turbine Developments include a Standard Line of 1,000 kW sets and a Unit fired with Solid Fuel



The illustration above shows "fluidised" peat flowing from a pipe

SOME time ago, January 19, 1950, we published a description of the Ruston 750 kW gas turbine unit which had been installed in the Company's power station at their Lincoln works. The machine, which has now completed over 3,000 hours running on a variety of fuels, has provided data and experience which have resulted in the development of a standard unit, the 750/1,000 kW Mark TA gas turbine. This design, which is being batch-produced in Lincoln, consists of two self-contained units; the gas-generator (consisting of the compressor and compressor turbine), and the power turbine and gearbox. "Vertebrate" construction has been used, whereby the rotors and stators of the compressor and turbines are located relative to each other by short internal structural paths and not through the bedplate. Normal installations can, by this system, be rapidly erected, and in "transportable" applications, no damage can arise even if the plant is supported unevenly.

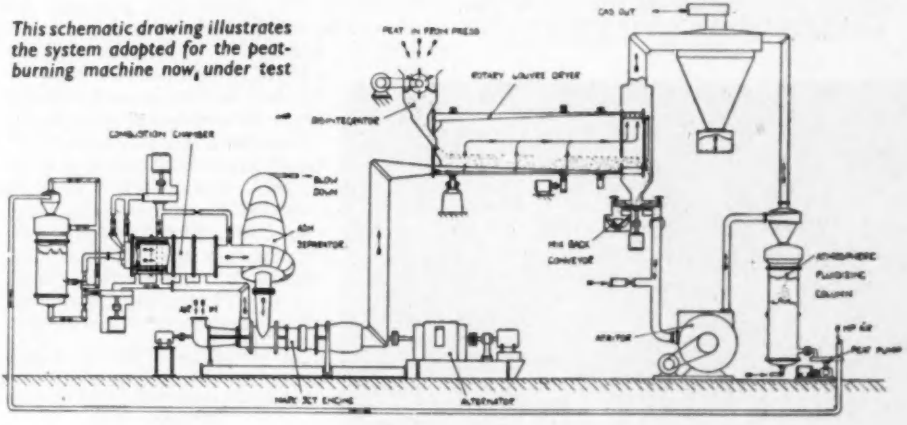
The standard epicyclic gearbox has been arranged to provide different output speeds including 1,800 and 1,500 r.p.m., to make the set suitable for 60 and 50 c/s alternators. A direct drive at 6,000 r.p.m. can also be obtained for driving rotary air or gas compressors.

A special shop has now been equipped at Lincoln to deal exclusively with the manufacture of the rotors, casings and blades of this standard type of turbine, and the system of production is such that an output of over one machine/week may be attained if necessary.

Design Alterations

The main developments embodied in the TA machines lie in the combustion chamber and the ducting arrangements. The former can operate on a variety of boiler oils including Admiralty Reference fuels "Mothball" and "Tarmac." Unfortunately these oils are somewhat rich in vanadium with resultant erosion and deposit troubles on the turbine blading. Work is, however, being carried out on this problem and it is hoped that a partial solution may be found by the injection into the

This schematic drawing illustrates the system adopted for the peat-burning machine now under test



Examining the compressor rotor in the stator for a TA gas turbine unit

fuel of certain additives. As far as the ducting is concerned, in order to facilitate installation in restricted places, and to make the design suitable for use with and without heat exchangers, arrangements have been made which permit the single combustion chamber to be positioned as required round the cylinders, in steps of 15°. A new type of exhaust duct has also been developed which leaves the casing of the reduction gear fully accessible. The air inlet casing has also been modified and is now in the form of a single-piece casting which can be phased round to any one of 24 optional positions without interfering with the bearing arrangements.

Accessibility is particularly good as by lifting the top half of the compressor stator casing, the blading and bearings are exposed and the compressor rotor can be lifted for inspection without disturbing any of the ducting. The single combustion chamber, being an external part of the turbine, can be changed without difficulty to suit different operating requirements, and by the use of a new design of burner mounting it is possible to change burners while the plant is on load.

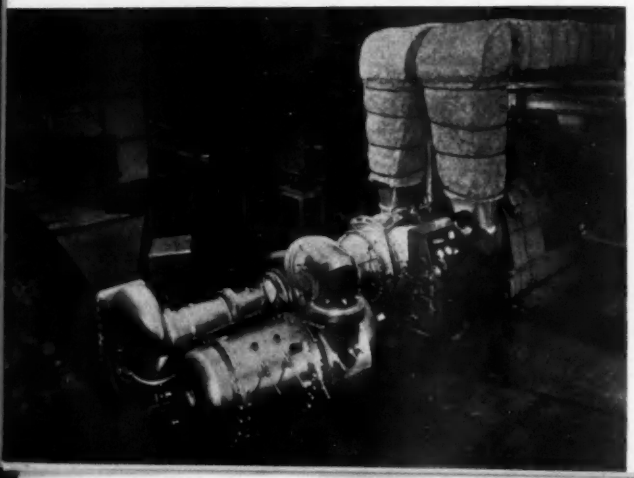
Applications

The applications for which this unit is particularly suited are wide and diverse. Among current orders are three for the Air Ministry, two without heat exchanger and one with, arranged to burn distillate fuel oil and coupled to a 3·3 kV 50 c/s alternator. The turbine and alternator are mounted on a combined base and arranged to break into three separate components each complete with rollers for wheeling into an aircraft and flying to site. The Kuwait Oil Co. have ordered a unit to run on natural gas, which will be used to pump oil to tankers, while a standard unit with heat exchanger is being built for the Admiralty and will be used for research work on the combustion of residual fuel oil.

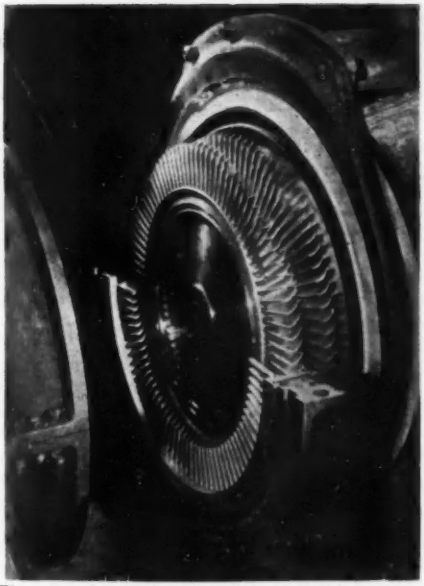
One of the fundamentals of the gas turbine cycle is that its rejected heat is in the form of high temperature gases. Advantage is taken of this waste heat in two further orders where the exhaust passes through waste heat boilers to provide hot water and process steam.

Peat Firing

As can be seen from the foregoing, the gas turbine is characterised by an ability to use a wide range of fuels, and this, coupled with the high temperature of the exhaust, makes the burning of high moisture content solid fuels a practicability. Peat, which is found in considerable quantities, is a suitable fuel, although considerable problems are involved in using it satisfactorily. Solutions to most of these have been found, and last week we were able



The test set up for the TA turbine. Note the separate combustion chamber on the nearside and the ducting arrangements



This view shows a power turbine assembly with the top half casing removed

to see a peat-fired unit running under load in the Ruston and Hornsby Lincoln Works.

The process involves dewatering the peat mechanically in a press and using the exhaust heat to remove the remaining moisture. The peat is then ground to extreme fineness and burnt directly in the combustion chamber. Although the principle is simple, great difficulty was found in devising means of transporting and controlling the flow of the powder. Ultimately, a system was developed by which air is forced into the powder which then forms a solid/gas combination with characteristics very similar to that of a liquid. This "fluidising" technique proved most satisfactory. A further problem was feeding the peat to the combustion chamber against the compression pressure. A rotary pump was, however, designed and manufactured by the Incandescent Heat Co. This comprises a rotating carrier plate containing a number of pockets which receive fuel at one station and carry it round to another station where entraining pressure air is admitted to carry the fuel out into the delivery line. The inherent simplicity of this system is complicated in practice by the seals necessary to restrict air and fuel leakage to a low rate and in this respect the pump has been found satisfactory.

Combustion Chamber

Peat has a high volatile and a low fixed carbon content, which leads to a rapid temperature rise in the primary combustion zone, and this must be taken into account in the design of a suitable combustion chamber. The final chamber is a refractory type lined with Silumanite bricks, and on starting these bricks are heated to about 800°C with a pilot oil burner. When this temperature is attained the peat is injected into the furnace through a grid burner, and the pilot burner can be shut down. The burner is particularly flexible in operation and it is expected that part load running down to about 20% should be possible using peat alone. Experimental work is now being carried out to establish the magnitude and nature of the ash problem.

Once the wear on the turbine blades has become appreciable, a cyclone separator will be inserted between the combustion chamber and the high pressure turbine.

When the unit has been developed to a satisfactory degree it will be taken to a peat bog in Scotland to determine running economics.

In the event of an open cycle gas turbine being run in conjunction with the milled peat process, there are two possibilities; one is to use the exhaust gas heat in order to dry more peat than is required by the gas turbine itself, this dry peat being then briquetted and sold as a domestic fuel—for which, incidentally, it is very satisfactory.

The work carried out has, however, shown the way to the use of other solid fuels, and the possibilities are now being investigated of using similar plants to use waste wood, brown coal and other combustible vegetable products.

The peat-fired turbine, showing combustion chamber, right

HEATING AT HOME

Results of C.U.C. Survey Merit Close Study

LATEST of the planned surveys which are so popular for inquiring into social habits today is one dealing with "the domestic use of solid fuel and solid fuel appliances in Great Britain." This survey was carried out by a private organisation on behalf of the Coal Utilisation Council, and it aims to show the extent to which different fuels are used in homes throughout the United Kingdom, with a detailed examination of the use of solid fuel in that category.

PREFERRED HEATING METHODS GIVEN FREEDOM FROM FUEL RESTRICTIONS—PERCENTAGES OF SAMPLE

Fuel	Room heating	Cooking	Water heating
Coal	92	63	45
Electricity ...	5	22	24
Gas	2	14	27
Other fuels ...	1	1	4

Working on the idea of a "main room"—call it living-room or kitchen—the results of the survey show that 98% of homes use solid fuel for their main method of heating. Gas and electricity are the alternatives, with a relative preference for electric heating in the higher income groups. Where there is some additional method of heating used, it is usually electrically powered, gas appliances lagging far behind.

From the answers given to the questionnaire which formed the basis of the survey, it appears that 46% of households have the main fire on for 12½ to 15 hours; 20%, 9½ to 12 hours; and 14%, 15½ to 18 hours. It was noted that only a small proportion, 6%, of households regularly keep a fire alight all night in winter.

It is noteworthy that the survey places great accent on the heating of the main room, and pays no attention to any other rooms in use.

Water Heating and Cooking

For water heating, the survey shows a wide range of uses over all fuels. It is noticeable that electric water heating is some way behind gas and solid fuel, both in winter (9, 44 and 47%) and in summer (14, 50 and 36%), on the basis of figures quoted in the survey. However, this applies to the "main" method of heating water. Where there is an "ancillary" method of water heating available, electrical heating is as common as gas.

Cooking, according to the survey, goes mainly to the gas boards, with 72% of households using gas, leaving 15% with solid fuel appliances, 14% with electric, and 1% with oil. There is a considerable variation here in terms of income groups, with electricity noticeably more popular at the higher levels. This increased popularity is also apparent in the newer houses, and the proportion of post-1945 houses having electric cookers is 24%, with solid fuel down to 12%.

Future Demand

A particularly interesting function of the survey was to examine reactions to freedom from restrictions on the purchase of coal and coke. Of those questioned 39% said that they would definitely buy more coal if that were permissible; rather surprisingly, 49% would equally definitely not do so. There is a general opinion amongst those who would like to buy more that this additional purchase would make no difference to their consumption of gas and electricity. Only 13% of these—that is, 7% of the complete sample—would expect to use less electricity as a result of more plentiful coal supplies.

One further particularly interesting question deserves mention. "If you had completely free choice at today's prices with limitless coal, gas, electricity, oil or other fuel, which method would you choose?" In interpreting the replies the date of the survey, March-April, 1952, has to be borne in mind, together with the place of the question in the series, immediately after a series of inquiries about solid fuel. With these qualifications in mind, the results are listed in the table.

As the replies to some of the questions were probably influenced by experiences shortly before the interview, it is relevant to repeat what is said in the full report about the weather: weather at first in the survey period was unseasonably warm, but soon turned into very wintry and later blizzard conditions.

In its comments on the survey, the Coal Utilisation Council calls for an intensification of the publicity effort with regard to modern solid fuel appliances, though this is thought to be hardly necessary for the open fire. Extended credit facilities are also called for because it has been found that many housewives who know about improved solid fuel appliances are "deterred from buying them because of the cost."

NOTES ON WIRING *by Megohm*

Colours and Cables

IN the Regulations for the Electrical Equipment of Buildings (12th edition), Reg. 311 sets out the colours to be used for cables connected to an a.c. supply as follows: (*a*) for 2-conductor circuits of a 2-wire system—red for the phase conductor and black for the earthed neutral conductor, (*b*) for 3-conductor circuits of a 3-phase 3-wire system—red, white and blue for the respective phase conductors, and (*c*) for 4-conductor circuits of a 3-phase 4-wire system—red, white and blue for the respective phase conductors and black for the earthed neutral conductor.

On installations served from a 3-phase 4-wire system, 2-conductor circuits of a 2-wire system may be coloured as set out in (*c*) above up to the final distribution board.

From the foregoing it is clear that all single-phase final sub-circuit wiring should be coloured red for the phase conductors and black for the earthed neutral conductors, but one may use the appropriate phase colours red, white or blue on 2-conductor circuits of a 2-wire system up to the final distribution board.

A correspondent says that there is advantage to be gained by the use of the appropriate phase colours on single-phase final sub-circuit wiring, especially where such circuits are housed in a sheet steel duct or trough, as it simplifies identification and gives visual effect when the covers are removed that medium pressure exists between the cables in the duct. The use of white and blue coloured cables for the phase conductors for 2-wire final sub-circuit wiring appears to be a contravention of Reg. 311, although it is easy to see the advantage to be gained by the adoption of coloured cables as outlined above. Maybe this is a point that will be given further thought by the Wiring Regulations Committee when considering revisions for their forthcoming 13th edition.

1/·044 Conductors

Consulting engineers and/or many specifying authorities in their specifications usually state in no uncertain terms that 1/·044 v.r.i. cables are not acceptable, whilst in the same specification may sometimes be found a clause setting out their requirements for the erection of mineral insulated copper sheathed cables whose conductors range from 1/·044 sq in cross section and upwards. It is difficult to understand why there should be objections to the use on lighting circuits of 1/·044 v.r.i. cables, whilst 1/·044 m.i.c.s. cables are acceptable, especially as it is not unusual for the connected loads on general lighting circuits to be limited from 600 to 1,000 W. One suggestion, that a 1/·044 cross-section conductor is not as flexible as a stranded conductor and, therefore, is more likely to be damaged by rough usage and at terminal connections does not appear to have been borne out in practice, since many thousands of yards of 1/·044 v.r.i. cable has been installed over a number of years, and since 1938 many miles of 1/·044 m.i.c.s. single and multicore cables have been put in commission. In view of the saving in cost that could be effected by the use of 1/·044 v.r.i. cables in lieu of, say, 3/·029 v.r.i., specifying authorities should give this matter careful consideration.

Speed Wire

In a recent issue of the *New Zealand Electrical Journal*, an alleged new type of t.r.s. cable for use in wiring buildings is described. The cable is called "Speed Wire" and has been introduced by the Cable Makers Australia Pty. Ltd., who make the claim that its use speeds up installation work. The cable is constructed in a figure 8 formation which enables the cores to be readily separated, complete with the insulated coverings, and it is stated that this saves much time as there is no need to tape or sleeve the cores as in the case of ordinary t.r.s. cable. I recall that a figure 8 t.r.s. cable was made and used in this country about 1933 and onwards. This construction was further developed by the introduction of a flat rubber web between the conductors to allow the cable to be fixed to walls and ceilings by driving pins through the web, but this arrangement was not very satisfactory and was soon discontinued. I did not know it was standard practice to tape or sleeve the stripped ends of ordinary t.r.s. cable other than on multicore cables, where it is often advantageous to fit core identification marker sleeves.

The cable makers say that a figure 8 t.r.s. cable makes for a neater, faster and better installation both electrically and mechanically, and that hours of time can be saved by electricians using this type of cable. This claim is, I venture to suggest, a flight of fancy.

INHERENT ERRORS IN WATTMETER INDICATION

Notes on their origin by a correspondent

A WATTMETER is generally used to indicate the electrical power entering a load. In many applications the inherent error of a wattmeter is truly negligible : the meter indication may then be taken as correctly giving the power entering the load. In some applications, however, for which a low-current meter may be required, the inherent error of the meter, caused either by its voltage circuit current or its current coil potential, is not negligible. It is probably fairly well known that for such a meter

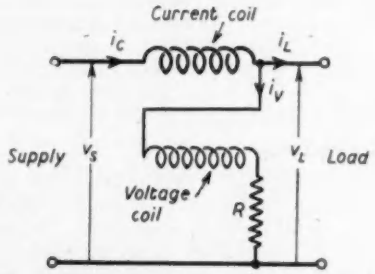


Fig. 1. Wattmeter with voltage circuit on load side of current coil

the voltage circuit power or current coil power, respectively, require subtracting from the indication to give the true load power, but explicit proofs of this, particularly for a.c., seem not to be readily available. These notes, therefore, aim to show, both generally and for single-phase sinusoidal a.c., how these errors arise, how they may be considered, and how a compensating coil may be used to remove the voltage circuit error.

Voltage Error

Consideration will first be given to a wattmeter connected as in Fig. 1, with the voltage circuit on the load side of the current coil, so that the voltage circuit current, as well as the load current, traverses the current coil. Instantaneous values of current and voltage will be taken so that it is immaterial whether the system is a.c. or d.c.

The instantaneous power p_L entering the load is thus given by the product of the instantaneous load current i_L and load voltage v_L: similarly for other powers. The voltage circuit has resistance R and carries instantaneous current i_V. The current coil current is i_C.

The wattmeter torque is proportional to the product of the currents i_C and i_V through its two coils, and its indication, w, is proportional to this torque. If k is the constant of proportionality, the instantaneous indication given by the meter (if the movement be regarded as light enough to follow all power fluctuations), is

$$w = k\, i_V i_C = k\, i_V(i_V + i_L)$$
$$= k\,\frac{v_L}{R}(i_V + i_L) = \frac{k}{R}(v_L i_V + v_L i_L)$$
$$= \frac{k}{R}(p_V + p_L)$$

This shows that the instantaneous indication is *at all times* the sum of the voltage circuit and the load powers. The mean indication (if the movement now be regarded as heavy enough to be unaffected by high-frequency torque pulsations, as in an a.c. system) is thus the sum of the

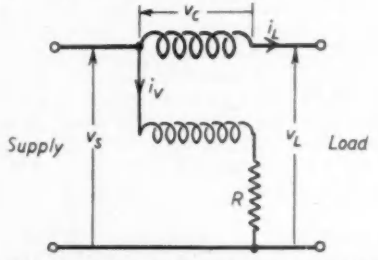


Fig. 2. Wattmeter with voltage circuit on supply side of current coil

mean voltage circuit and load powers, hence is a true mean for d.c. and a.c. of all wave forms.

It thus follows that, to obtain the true load power from a wattmeter connected as in Fig. 1, the voltage circuit power must be subtracted from the indicated power.

Current Error

Consideration will next be given to a wattmeter connected as in Fig. 2, with the voltage circuit on the supply side of the current coil, so that the current coil voltage, as well as the load voltage, is applied to the voltage circuit. Since

from Fig. 2 $i_C = i_L$ and $v_S = v_L + v_C$ the instantaneous indication of the movement (if it be light) is

$$w = k\, i_V i_C = k\frac{v_S}{R} i_L$$

$$= \frac{k}{R}(v_L + v_C)\, i_L = \frac{k}{R}(v_L i_L + v_C i_C)$$

$$= \frac{k}{R}(p_L + p_C)$$

This shows that the instantaneous indication is *at all times* the sum of the current coil and load powers. The mean indication (if the movement now be regarded as heavy) is thus the sum of the mean current coil and load powers, hence is a true mean for d.c. and a.c. of all wave forms.

It thus follows that, to obtain the true load power from a wattmeter connected as in Fig. 2, the current coil power must be subtracted from the indicated power.

The A.C. Case: Voltage Error

Though the general proofs given above cover the a.c. case, it is interesting to consider the problem afresh, assuming sinusoidal currents and voltages, and to show by using vector diagrams that the above conditions still apply.

With a wattmeter connected as in Fig. 1, with the voltage circuit current traversing the current coil, let V_L be the r.m.s. potential across the load, leading the r.m.s. load current I_L by angle φ_L: the mean load power is thus $V_L I_L \cos \varphi_L$, as is well known from a.c. theory. The current coil potential V_C leads the current coil current

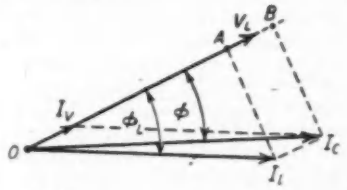


Fig. 3. Voltage error for a.c. case, wattmeter connected as in Fig. 1. Instead of the instantaneous values shown there, r.m.s. quantities are indicated

I_C by angle φ_C (which is the angle of the impedance of the current coil). The voltage circuit is assumed to have resistance R, to have negligible inductance, and to carry current I_V.

The mean wattmeter indication W is proportional to the product of the r.m.s. currents I_C and I_V through its two coils, and to the cosine of the angle φ between these two vector quantities.

The vector diagram of Fig. 3 shows the voltage and current relationships; I_V is in phase with v_L, and is added vectorially to I_L to give I_C. The indicated mean power W is given by

$$W = k\, I_V I_C \cos \varphi = k\frac{V_L}{R} I_C \cos \varphi$$

$$= \frac{k}{R} V_L . OB \text{ (from the vector diagram)}$$

$$= \frac{k}{R} V_L (OA + AB) = \frac{k}{R} V_L (I_L \cos \varphi_L + I_V)$$

$$= \frac{k}{R} (V_L I_L \cos \varphi_L + V_L I_V)$$

$$= \frac{k}{R} (P_L + P_V).$$

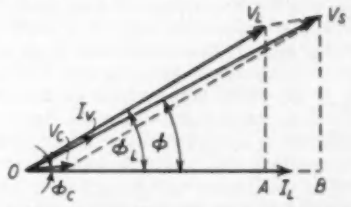


Fig. 4. Voltage error for a.c. case with wattmeter connected as in Fig. 2. Instead of the instantaneous values shown there, r.m.s. quantities are indicated

It is thus again seen that, for this connection, the indication is the sum of the mean voltage circuit and load powers.

The A.C. Case: Current Error

With a wattmeter connected as in Fig. 2, with the current coil voltage as well as the load voltage applied to the voltage circuit, let the r.m.s. currents and voltages be designated as above. The vector diagram of Fig. 4 shows the voltage and current relationships. I_V is in phase with the supply voltage V_S. V_C is added vectorially to V_L to give V_S, whilst V_L and I_L remain as before.

The indicated mean power W is given by

$$W = \frac{k}{R} I_V I_C \cos \varphi = \frac{k}{R}(P_L + P_C)$$

via geometrical manipulation as before.

It is again seen that, for this connection, the indication is the sum of the mean current coil and load powers.

Wattmeter Compensation

In low current wattmeters, especially if they are to be used for measurements at low power factors, the error powers may be an appreciable fraction of the total. A method, known as 'compensation,' of eliminating the errors, may

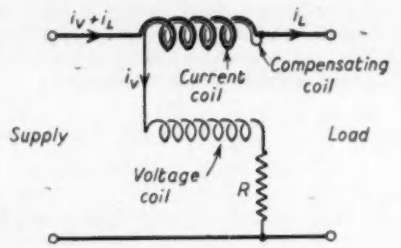


Fig. 5. Connections of compensated wattmeter

then be worth introducing. A compensated wattmeter has its voltage coil connected to the load side of the current coil; in normal operation the current coil would thus carry excess current i_V through its turns, as shown in Fig. 5, thus giving excess ampere-turns to the current coil. In a compensated wattmeter, these excess ampere-turns are opposed by the addition of a compensating coil, with the same number of turns as the current coil, wound with the current coil and carrying the voltage circuit current : this coil also is shown in Fig. 5. The net current ampere-turns arising from the voltage circuit current are thus zero, hence the wattmeter indication will be unaffected by this current, and will become the mean of the product $i_V i_L$ when these are the instantaneous voltage circuit and load currents.

Conclusion

It is thus seen that the voltage circuit or current coil powers are usually included in a wattmeter indication. The voltage circuit power, included when the voltage circuit current traverses the current coil, is generally the most convenient to include, since it is often truly negligible. It may, in any case, easily be calculated, and, if a nominally constant voltage supply is in use, may be taken as a constant error to be subtracted from the indication to give the true load power.

The current coil power, included when the current coil voltage is part of the voltage applied to the voltage circuit, may often be convenient to include when a variable voltage load is being studied, since the load current will then be readily available, hence the current coil '$I_C^2R_C$' power easily calculable.

However, when the extra convenience of compensaton for the voltage circuit error is considered worth the added complication, a compensating coil, carrying the voltage circuit current through an equal number of opposing turns wound with those of the current coil, may be introduced: a wattmeter so compensated will always indicate the true mean load power.

Anglo-American Productivity Scheme

UNDER the general direction of the President of the Board of Trade, some £3 million of counterpart funds arising from the operation of the U.S. Mutual Security Agency economic aid scheme will be devoted during the next three years to increase productivity in this country. This is the effect of a recent agreement signed between the British and American Governments.

£457,000 is to be allocated to establishing an advisory service, which will give special attention to the smaller concerns, with a view to increasing productivity and lowering prices. The staff of the advisory service will be recruited from a wide range of organisations.

Expansion of research and promotion of studies cover the next division, which is to receive £1 million. The research work will deal with matters affecting the efficiency of the national economy, such as the effect of incentives and of restrictive practices; and such medical matters as the design of machine controls. The programme of research will be carried out largely under contract by universities and professional and learned societies. Under "promotion of studies" is included the establishment of courses for staff and the provision of scholarships. Part of the money might be for building up a technological university.

Additional publicity aimed at emphasising the help the programme can give, and at spreading the results of the research programme, will employ £178,000 from counterpart funds.

Finally, there is to be an expenditure of £1 million on short term loans to industry for equipment and the re-organisation of plant. In the administration of this fund, committees representing both sides of industry will give advice. Guidance on general policy will be given by an interdepartmental committee. No period has been set for this loan operation, which is particularly aimed at small and medium-sized enterprises.

Other sections of the agreement provide for the U.K. to play its part in an O.E.E.C. productivity agency, at a cost to the funds of £254,000, and there is an additional £321,000 to be spread over various projects.

TESTING BUSHINGS

Suggested New Specification discussed by I.E.E. Supply Section

EXPERIENCE in recent years has made possible a notable advance in the specification of tests for bushings in relation to conditions in service. In a paper presented last week to the I.E.E. Supply Section, Messrs. H. BARKER, M.SC., A.M.I.E.E. (The Bushing Co. Ltd.) and H. DAVIES, A.M.I.E.E. (A. Reyrolle and Co., Ltd.) dealt with this question with special reference to synthetic-resin-bonded paper bushings.

The authors summarised the relevant service conditions under four headings. Bushings should be able to withstand continuously, and without undue deterioration the maximum operating voltage of the system, which may be 15% higher than the nominal voltage. Transient overvoltages due to lightning or switching operations must be resisted, and the bushings should be thermally stable at the highest ambient temperatures and current loadings likely to be met in service. Finally, they must be designed mechanically to resist the extremes of atmospheric conditions.

Deterioration may be caused by transient overvoltages, particularly lighting, which can cause either a flash-over followed by a power arc, or more commonly, failure along the laminations coupled with partial external flashover or partial puncture. Occasionally complete radial puncture occurs.

In the past failures due to thermal instability were not uncommon, some of them being due to excessive ingress of water into the dielectric. However, improved materials and manufacturing technique, combined with rigorous testing, have rendered failure from this cause "virtually unknown with insulators of modern manufacture."

TABLE 2—TYPE, ROUTINE AND SAMPLE TESTS

Tests	Rated voltages		
	11 kV	22-25 kV	66 kV and above
One-minute over-voltage test	R	R	R
Power-factor/voltage test	S	R	R
Internal-discharge test...	S	R	R
Thermal-stability test	S	S	R
Dry impulse withstand test	T	S	S
Repeat power-factor/voltage test ...	T	S	S
Corona test	T	T	T
Power-frequency wet withstand test ...	T	T	T
Under-oil impulse withstand test	T	T	T
Repeat power-factor/voltage test	T	T	T

R = Routine. S = Sample. T = Type.

Internal ionisation is another possible cause of bushing failure. It occurs because synthetic-resin-bonded paper is not homogeneous

TABLE 1—PROPOSED CHARACTERISTICS OF BUSHINGS FOR VOLTAGES UP TO 275kV

Rated voltage	Corona voltage	One-min. over-voltage	Power-factor knee and internal discharge	Voltage for thermal-stability test		Wet withstand value		Impulse air withstand value [3]	
				Earthed system [1]	Unearthed system [1]	Effectively earthed [2]	Non-effectively earthed	Effectively earthed [2]	Non-effectively earthed
kV	kV	kV	kV	kV	kV	kV	kV	kV	kV
6·6	5·5	17	5·5	7·6	7·6	—	22	—	60
11	9	27	9	14	14	—	30	—	80
15	12	36	12	17	17	—	40	—	100
22	18	52	17	25	25	—	55	—	150
33	27	76	25	38	38	—	80	—	200
44	35	100	30	50	50	—	100	—	250
66	53	150	44	76	76	—	150	—	350
88	70	175	61	76	95	150	195	380	450
110	88	200	76	83	127	195	240	450	550
132	105	250	88	99	152	240	285	550	650
165	130	300	110	124	190	285	350	650	750
220	175	365	147	165	250	350	460	900	1,050
275	220	485	185	206	315	460	—	1,050	—

[1] For the purpose of the table, an earthed system is one in which the duration of an earth fault is very short.
[2] An effectively earthed system is one in which, on a phase-to-earth fault, the maximum voltage on the sound phases rises to not more than 80% of the maximum phase-to-phase voltage.
[3] In addition, impulse oil withstand voltages are specified.

material, and a bushing inevitably contains a small amount of air together with traces of moisture and organic compounds. Continuous ionisation of such inclusions may cause degradation or destruction of the material at the location of the discharge. It is by no means certain that all internal discharges are harmful, but some failures have resulted from them.

A final cause of deterioration is surface tracking. Normally a bushing kept indoors in air shows no surface deterioration provided that its surface is kept reasonably clean and dry. In adverse conditions, indoors, surface fouling by moisture and the products of the corrosion of metal fittings may cause flashover.

With all these considerations in mind, the authors have prepared Table 1 as a summary of their proposed characteristics of bushings. Table 2 shows the suggested division of the tests into routine, sample and type categories.

Site Testing

For site testing the authors consider that the power factor test is the most informative although the well-established insulation-resistance test has some value. Amongst methods which may be applicable to site testing, but which have not yet been tried to any extent, they mention the examination of the charging current and the residual voltage of an insulator, the measurement of power factor and capacitance over a range of very low frequencies, and the use of electronic methods of detecting internal discharges. In their conclusions to the paper, however, the authors suggest that on modern insulators, made and tested to the standards laid down in the paper, it is not necessary to carry out routine testing on site. Installations of exceptional importance may merit the provision of suitable apparatus (including a special voltage transformer) for on-load power-factor measurement.

DISCUSSION

Mr. R. Davis (N.P.L.) said that the main change in specifications since 1939 had been the incorporation in them of impulse tests, with the substitution of a withstand test for a flashover test. The attitude of the manufacturer was that the user should see that a bushing did not get more than the withstand voltage allocated to it.

Mr. F. C. Walmsley (Micanite and Insulators Co.) disagreed with the authors' proposal that the thermal stability test should be a routine test on bushings with ratings above 66 kV. He thought it should be only a sample test and should apply only above 110 or 132 kV. With an extension of the voltage range beyond, say, 150 kV, it might be necessary to look to some material other than synthetic-resin-bonded paper, such as oil-impregnated paper.

Mr. J. S. Cliff (G.E.C.) thought it would be agreed by all users of bushings that B.S.223 was out of date and badly in need of revision. He had attended some 50 meetings for this purpose since 1944, but not all the basic principles had yet been settled. A bushing normally formed part of some piece of apparatus, and unless care was exercised the tests on the bushing could be elaborated without any material gain in the overall performance of the complete apparatus. On some of the largest circuit-breakers the cost of the bushings was 50% of the total cost of the circuit-breaker.

Mr. D. M. Cherry (B.E.A.) remarked that it was now becoming painfully clear that they could not expect to replace switchgear and other gear after the nominal amortisation term of 20 years, but would have to go on using it so long as it was not positively dangerous. They were, therefore, interested in securing an indefinite life. Each bushing should start its life with a proper record card giving the salient particulars of the original tests, and then it should be possible to tell which of the tests were necessary, as shown by the life obtained from the bushing.

Mr. W. J. Brown (Bushing Co.) emphasised that the cost of testing a bushing was a considerable proportion of its cost of manufacture, so that it was important to be sure that the tests checked the suitablilty of a bushing for its service conditions.

Mr. A. W. Stannett (B.E.A.) supported Mr. Cherry's request that the original properties of the bushings should be quoted, because otherwise it was difficult to find out what had happened to a bushing over a period of years.

Mr. P. G. Ashley (Metro-Vick) gave instances of where the hissing characteristics of bushings had improved with time, and suggested that the hissing test should now be abandoned. He expressed himself as astounded that the thermal stability test should be adopted as a routine test. He had no doubt that his bushings would pass it, but to apply it to every one would cause grave difficulty.

Mr. W. A. McNeill (Cooke and Ferguson) expressed surprise that no mention had been made of X-ray photography for the testing and inspection of bushings. He had found this a valuable asset in quality control, and X-ray negatives of adequate clarity could be obtained with a simple 100 kV set.

Mr. E. T. Norris (Ferranti) maintained that most of the authors' troubles were due to the use of synthetic-resin-bonded paper bushings. Oil-impregnated paper, he said, was an immeasurably better dielectric; the ionization test became a mere formality, the hissing test was out of place, and the question of thermal stability did not arise.

PROBLEMS AND PRACTICE in Engineering

Neutral Fuses

RECENTLY on being called to a fault on the strong room lighting, I found that of three lighting points, each controlled by its own switch, the first point remained alight irrespective of its switch position, whilst to operate the other two points it was necessary to put the first switch in the on position.

On checking the circuit I found that the switches were in the wrong pole, the neutral fuse had blown and the first point switch line was down to earth.

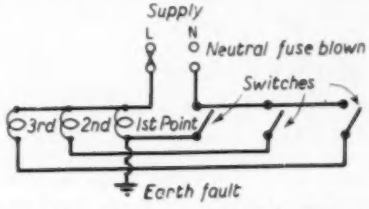


Diagram showing the earth fault and blown fuse, whilst lamps remained lit

As can be seen from the diagram, the fault circuit was as follows : from line feed to first point, through the lamp and via earth fault to neutral. For second and third lights through the lamps, switch lines and switches along the switch loops across the first switch and then to neutral via the earth fault in the switch-line.

These faults re-emphasise the need to ensure that all single pole switches are in the live pole, and neutrals on a.c. are solid.—*A. Adams.*

Switch Substitution

I WAS called to a fault on an extractor fan some time ago, and on examination I found the centrifugal switch had broken beyond repair. The motor was single phase, 250 V, rated at 5 h.p.

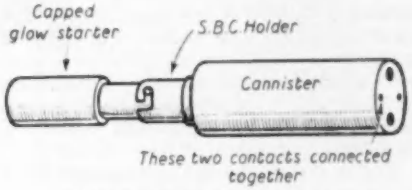
The frame had been built in the top of the wall and as the motor was part of the frame as one casting the brick work would have to be pulled out to remove it. As it was important that this motor had to run within ten minutes, there wasn't much time to think. I cleared the two leads from the centrifugal switch and taped them, so as they would be free from damage. I then put the main switch on, and started the fan by a slight push with a stick.

The next morning I paid another visit and removed the broken switch. As the motor was still needed at night, and it would be impossible to get this repaired, perhaps for a week or two, this called for some thought. Looking around my workshop I found a 250 V, 15-amp push-button wall type. I wired this to the leads of the centrifugal switch, installing the push near the usual starting switch. The operator had just to put the main starting switch on and press the pushbutton until the motor reached full speed which took a few seconds.

I have found since that it is impossible to purchase the new centrifugal assembly for the motor, as the motor is obsolete. In this way the motor has been worked for over six months and is still satisfactory.—*G. A. Leighton.*

Glow Starter Adaptor

MOST test benches have equipment for testing fluorescent lamps and canister starters, but few have facilities for testing capped glow starters. Therefore, the following item I have made has proved very useful.



Adaptor for glow starter switch

Remove the interior from a used canister starter and cut a hole in the bottom of the canister to take an s.b.c. holder.

Cut away the starter and suppressor condenser from the "Paxolin" disc, short out the two small pins, if this is not already done, and connect the s.b.c. holder across the two large pins. Then replace the disc in the canister. The glow starter can then be inserted into the s.b.c. holder, and the canister into the normal canister holder.—*W. S.*

Contributions to this page dealing with specific items of interest to electrical engineers and maintenance men are welcome, and, if accepted, will be paid for at our standard rates. Problems of a practical nature to which a solution is required will also be considered. Contributions should be written on one side of the paper only and may be accompanied by sketches, which will be re-drawn for publication

Fit for Ideal Homes

A WEALTH OF NEW DOMESTIC APPLIANCES MAKE THEIR DEBUT AT OLYMPIA, THIS WEEK

ANNUAL event which always heralds in the spring, the *Daily Mail* Ideal Home Exhibition which opened on Tuesday at London's Olympia exhibition centre this year offers visitors many striking introductions.

New laundry equipment is the most prolific group. And in this sphere there are new washing machines, both orthodox and unorthodox, electric ironers, irons and drying machines. The kitchen is the next target for designers whose ideas have materialised on numerous stands where cookers and refrigerators of contemporary design are featured.

A number of new vacuum cleaners make their first appearance at the show, and interesting heating appliances are available.

Laundry Work

The General Electric Co. have taken advantage of this Coronation year to introduce several entirely new appliances of striking appearance. They have produced a brand new washing machine with power operated wringer which stows away in the base of the cabinet to allow their new rotary ironer to be mounted in the same socket. This is heat-controlled and handles all items of laundry with speed and efficiency. For finishing off certain more difficult fabrics and garments they have launched a new lightweight iron having an aluminium soleplate built-in element.

English Electric also have a brand new rotary ironer of similar design which will operate from the E.E. washing machine which, it has just been announced, is now equipped with a 3 kW tubular sheathed immersion heater controlled by three-heat control. This 10 gallon capacity machine is equipped with a power-operated wringer and automatic draining pump.

Heating elements rated at 3 kW have now been incorporated in the new Servis "Superheat" washing machine by Wilkins and Mitchell. The new machine resembles the "cabinet" model but is finished in white and bright red.

Universal Boilers and Engineering Co. have launched their Swirlux "500" which, although only a small model, handles up to 6 lb dry weight of washing. It incorporates a special agitator which ensures agitation of the water right to the top of the machine.

Another stylish newcomer is the "Goblin" model which has a new type of agitator; the top cover of this machine, square in design, can be removed and used as a useful linen basket or drip pan for the wringer.

The well-known "Bendix" automatic home washer, model "D," is shown in operation on the company's stand but with a difference—it is fitted with Perspex panels so that housewives can see for themselves the exclusive "Dynasuige" tumble action in operation

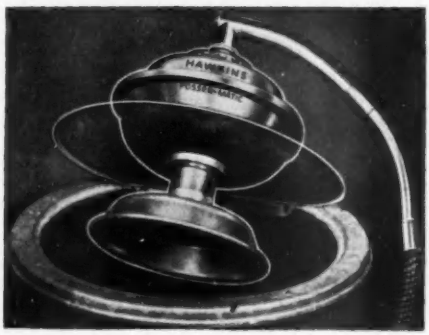
Parnall (Yate) Ltd. are making a feature of modern electric home laundry equipment. Among the appliances displayed is a type E.W.50 washing machine fitted with powered pump and wringer which, they say, can do a week's family wash in one hour.

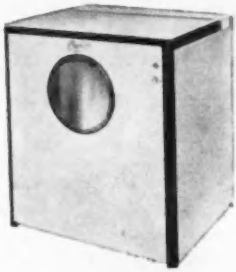
The Castra washing machine, which is now handled by Easiclene Porcelain Enamel (1938) Ltd. and bears the firm's name, is an efficient moderately priced unit for the smaller home.

Two unusual appliances which break away from tradition both in design and operation are the "Posser-Matic" unit, known to televiewers in "Inventors Club," which operates by pulsating a bell-mouthed "posser" up and down in the water by compressed air supplied by a normal cylinder vacuum cleaner, is marketed by L. G. Hawkins and Co., Ltd.; and the "Carefree" clothes washer—in effect a watertight plastic enclosed electric motor unit sitting on top of a high-speed revolving impeller unit which can be placed in the sink, converting that into an efficient washing unit. This unit is shown by Carefree Domestic Appliances Ltd.

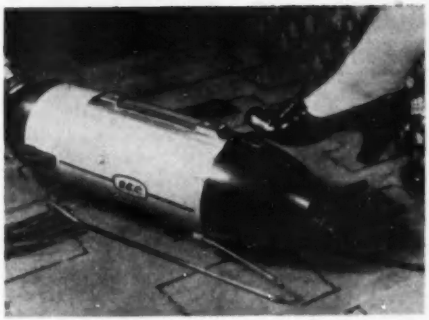
Airing cupboard heaters of low wattage are another new G.E.C. introduction. Also new is

A vacuum cleaner powers the Posser-Matic





Drying clothes indoors is a brief business with the Oprim Drier on the left. G.E.C. offer (right) this new rotary machine to speed up the task of ironing



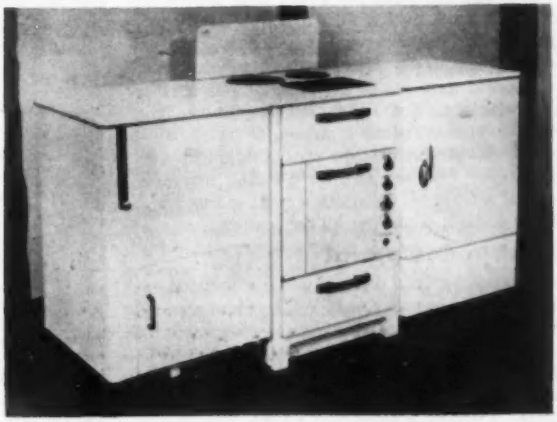
Cleaner houses with more convenience result from the use of the G.E.C.'s new cylinder model with foot switch, on the left, or Vactric's re-styled upright cleaner, the R.53

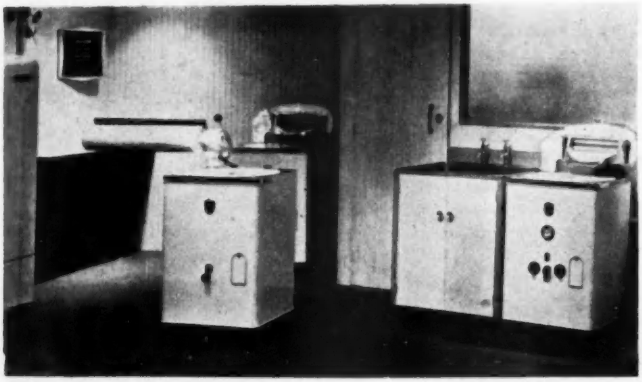
"Carefree" washing is said to result from the unit below. It stands in the sink and agitates the water with its high-speed impeller

The latest G.E.C. washing machines and refrigerator were designed to align with their cooker to form a unit fitment

This new Baby, the "Cresta," has 1½ cu.ft. capacity. The interior is finished in an unusually metallic blue colour

Below is the Instaheater which heats 1 pt. of water in 60 secs.





The English Electric new arrivals can be seen on this section of their stand. The ironer attached in place of the wringer on the normal washing machine, whilst on the right is the new machine with a 3 kW immersion heater

the Oprim drying machine in which a rotary clothes wheel propelled by the air stream from a fan unit turns round above black heat sheathed heating elements in the base.

When one talks about drying equipment the firm of J and A. Walter should be remembered for their neat and useful clothes drier.

Electric ironers as already mentioned, are featured by English Electric and G.E.C. in addition to the earlier arrival, the "Oprim." Electric irons, of course are widespread, but two most interesting models at the show are the "Victor" safety iron produced by Bylock Electric having a counter-balanced elbow to the soleplate which when the pressure of the hand is lifted from the handle automatically lifts the soleplate off the ironing surface, and the lightweight travelling iron by Morphy Richards which incorporates an ingenious voltage selector so that whether the local supply be 100 V or 250 V the iron will function properly. It is also equipped with a heat-control switch and has a soleplate only slightly smaller than average, yet the weight is only $1\frac{3}{4}$ lb. An interesting rubber two-pin plug is supplied with these irons. The pins detach and are reversible; one end is the normal pin to B.S. Specification, the other is the thinner pin encountered in some quarters, whilst a third set of flat American-type pins is supplied with the iron. The new Hoover washing machine, which is featured on another page in this issue, is, of course, displayed by the makers.

Kitchen Equipment

Interest in this section will be focused on several new items. On G.E.C.'s stand there is their new DMM.30 table-top refrigerator of 3 cu ft capacity which has been designed to fit in with the cooker and new washing machine to form a nucleus of a well-planned unit kitchen. Jackson Electric Stove Co.'s Two-ninety cooker is featured elsewhere in this issue, and it is prominent on the firm's display where Philip Harben, noted TV cook, is giving demonstrations, using the special electric cooker the company designed for TV programmes.

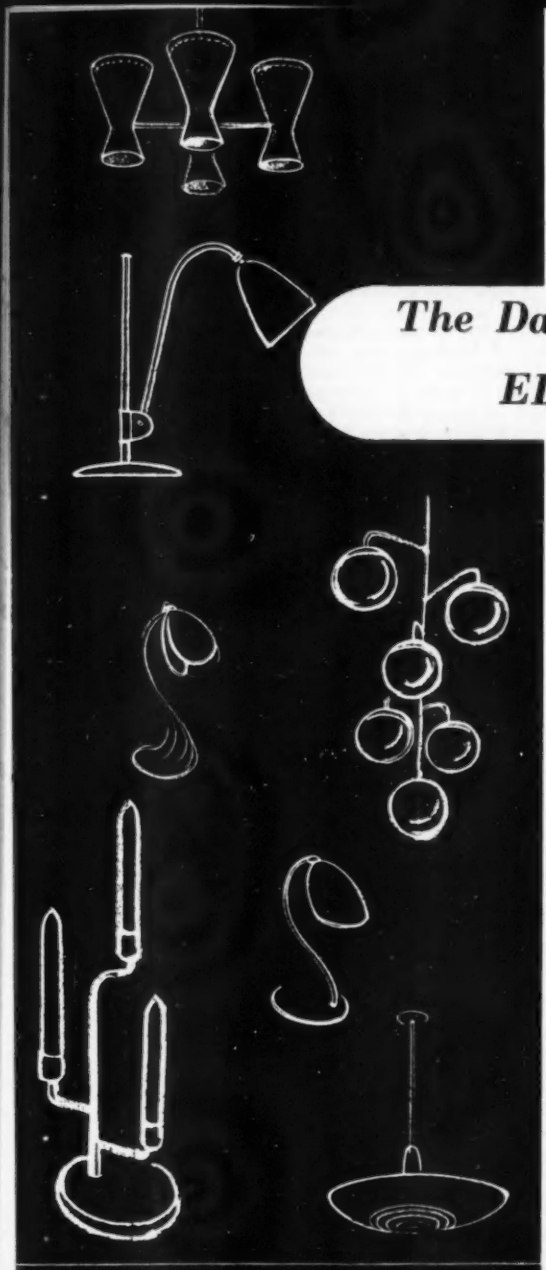
Other new arrivals include the Cresta $1\frac{1}{2}$ cu ft absorption type refrigerator by Insulations and Construction Ltd., Howard Foss's Mixer which is now available without the stand or bowls, as a hand model a special wall bracket is supplied for holding the mixer when not in use. Kenwood Electrics are, of course, featuring the latest attachment to their Electric Chef—the juice extractor unit and giving demonstrations of their many kitchen aids.

A useful little appliance making its first appearance this year at Olympia is the Instaheater, an attractive porcelain jug which incorporates a carbon-rod heater element at 500 W which does heat one pint of water to boiling point in 60 secs.

Reverting to the subject of refrigeration, Prestcold have an unusual display which has been designed as part of a special sales campaign. Based on the theme "Save money with a Prestcold" the display outlines the way to save money using a Prestcold refrigerator and offers replicas of a Prestcold domestic refrigerator as a money box.

Vacuum Cleaners

New introductions which will surely prove attractions are the stylish red and grey model which is the first cylinder model marketed by G.E.C. released to the public on opening day. Two important points which will find immediate favour with the housewife are the provision for stowing the flexible cable and the foot-operated switch. Such a switch is fitted to the latest Vactric Model W.202, finished in gold "Dimenso" and chromium. New accessories include a spraying unit and an anti-moth vapouriser. Replacing the Vactric R.45 is the new R.53, an upright cleaner in gold and maroon with a new front cover-plate to provide improved suction.



A. B. READ, R.D.I., F.S.I.A.
asks what is wrong with our designers when he throws some light on

The Dark History of ELECTRIC LIGHTING

Mr. A. B. Read's artistic ability was much in evidence at last week's light-hearted meeting of the Design and Industries Association. During the course of his talk under the above title, on the design of modern lighting fittings, the audience was treated to series of cartoons which depicted two main facts. Firstly, came the almost startling discovery that few designs produced today bore any semblance to uniqueness, and secondly, most of the ideas which found their way to the showroom originated in a foreign land. It was significant that among the fifty or more drawings, Mr. Read found praise for only one fitting and a good word for only a few more. The model lucky enough to be lauded was the goose neck adjustable desk lamp. That lamp, said Mr. Read, was really good, being of creditable design, purely functional, lasting, adjustable and possessing a useful reflector.

There was little praise to come. As sketch followed sketch to show that all present-day fittings centred round half-a-dozen basic designs, including the inverted dustbin lid pendant fitting, Mr. Read came to the swan neck table lamps, the modern design being so little different to a model exhibited in Zurich as long ago as 1903. If assymetrical designs were good, said Mr. Read, they certainly were not new. Fittings like the tree of globular lamps reproduced here, were made in Germany in the early 1920s. He deplored Diabolo fittings, likening the designers of that type of lamp to the architect who envisaged the photograph of his building in a magazine before beginning to conceive his edifice. He criticised some louvre fittings which, he said, appeared like large-sized mouth-organs, and with a few more deft strokes of the chalk showed his dislike of the congested appearance of modern lighting showrooms. Some contraptions, he said, were suitable for particular installations but most people and rooms required simple designs. Mr. Read concluded by saying that if the public was worried it was because it was bewildered by the multiplicity of designs. It wanted fittings which were pleasant and functional. He asked that designers should strive to achieve a standard which would bring foreigners to England to look at our ideas, instead of going abroad to crib ideas from them.

overseas news

Renovating Distribution

The Public Utilities Commission of Kingston, Ontario, proposes to spend up to $250,000 on the renovation and improvement of the town's power distribution system. The work, for which approval of the Hydro Electric Power Commission of Ontario is being sought, involves the construction of a new substation, together with additional transformers at other substations. There was a proposal for the installation of underground power cables, but it was pointed out that the cost would be prohibitive for a city the size of Kingston.

Sidelight on St. Lawrence

In connection with the St. Lawrence Seaway and Power project, Mr. Chevrier, the Canadian Transport Minister, has revealed that negotiations are still proceeding between the federal government and Quebec regarding the Lachine section. He suggested that Canada will 'go ahead and build the deep waterway channel around Lachine leaving Quebec to develop the power potential there—1,200,000 h.p.—some time in the future.

The Quebec Government is spending a large sum on a power development on the south shore and will likely divert excess power from there to meet increasing industrial demands in the Montreal area.

B.C.-Alberta Line

The Calgary Power Co. Ltd. proposes to construct a 170 kV transmission line from its Elk River power line to Kimberley where it is intended to tap off the transmission system of the Consolidated Mining and Smelting Co. The suggestion has also been made that this connection between Calgary Power and the West Kootenay source might be extended in the future to set up a grid system which would encompass Cominco, Grand Coulee, Wash., the British Columbia Power Co., B.C. Government Power and the present grid system in Alberta.

Winnipeg Acquisition

Acquisition of the Winnipeg Electric Co.'s electric properties has meant an annual saving of between $2,500,000 and $3 million to the Manitoba Hydro-Electric Board, Premier D. L. Campbell stated a few days ago. By the acquisition, the financial position of the Manitoba Board had been changed from a prospective initial 12 months' deficit of $1,500,000 to $2 million per year, into an operating surplus of approximately $1 million, and this without any immediate increase in present schedules of electricity rates, he said.

Water Power Survey

A survey of the water power resources of Yukon, with a view to hydro-electric developments on the Yukon-British Columbia border is to be carried out by Frobisher Ltd., with Federal permission, Mr. Winters, the Minister of Resources, has stated. It is believed that certain lake and river basins in the Yukon have a potential 5 million h.p. Mr. Winters stressed that these present surveys were very much in the initial stage, but if they were successful there would be further negotiations with the Federal authorities.

Manitoba Development

The vast power potentiality of northern Manitoba may be developed to some extent during the next ten years, Mr. D. M. Stephens, chairman and managing director of the Manitoba Hydro-Electric Board declared recently. He visualised more mining areas being opened up, and more railroads built, until northern Manitoba would be linked with far northern Alberta by rail. But power was needed, he said, and he hoped before very long the Nelson Basin would be able to claim hydro-electric power as its dominant resource. Two to three million h.p. lies there, he said, and was as yet unharnessed. An export market must be found for the power which could be realised from this source, and here several problems presented themselves. Transmission of power over great distances was a costly business, and consumers would have to be found to make the project worthwhile, he added.

Ontario Change-over Cost

An estimate of $275 million as the cost of the complete frequency conversion programme of the Hydro-Electric Power Commission, instead of the $191 millions estimated when the task was started in 1948, has been given by Mr. R. H. Saunders, chairman. To the end of November 1952, the last date for which figures were available, the Commission has paid a total of $118,182,897 for the conversion job—$91,199,266 for work completed and $26,983,631 for equipment and materials for work yet to be done. Mr. Saunders emphasised that the main reasons for the large increase in costs could be found in the tremendous industrial expansion in the section of the province affected by the conversion and the resulting higher standard of living enjoyed by the people.

Move for Volta River

The Gold Coast Legislative Assembly has now approved the establishment of a preparatory Commission on the Volta River project with a view to arriving at a final agreement. The project concerns the establishment of a hydro-electric generating

station, with a capacity of 564 MW, for the development of an installation in the Gold Coast to smelt aluminium on a large scale. In last week's discussions in the Assembly, there was some criticism principally on the ground that the Gold Coast share of the project was not sufficient and that this would lead to control of the scheme by private enterprise and the British Government. An assurance was given by the Minister of Commerce that the proposed contribution by the Gold Coast to the power project could be increased from £8 millions to a much larger sum if the money were available, and that if it were finally decided to go ahead with the scheme and the Gold Coast were able to provide £20 millions the British Government would not refuse to reduce its own contribution accordingly.

An Interest

It is reported from Johannesburg that Messina (Transvaal) Development, the South African copper mining concern, propose to take an interest in Aycliffe Cables (South Africa), which was until recently a subsidiary of Aerialite Ltd., of Stalybridge, but which still retains an interest in the company. The Messina Concern is acquiring about 25% interest in Aycliffe Cables, it is stated, presumably as a useful domestic outlet for a proportion of its copper production.

Underground for Bombay

The construction of an underground railway system for greater Bombay has been suggested by a member of the City Council. The present transport system of Bombay, though quite efficient, has now to provide for the needs of a population which has increased enormously in the last few years. There are about 700 suburban trains running daily in Greater Bombay. The suggestion for the construction of an underground railway has already been proposed for Calcutta, and a committee appointed by the Government of India is now in that city exploring possibilities.

Protecting Fan Industry

The Pakistan Tariff Commission has opened an inquiry into the question of further and more permanent protective measures for the domestic electric fan industry. The current protective measures are due to expire this month. Only 14,000 units were produced in Pakistan in 1952, compared with annual requirements estimated by the Commission at 45,500 over the next few years. But the manufacturers contend—and the Commission agrees—that their installed capacity is sufficient to satisfy total domestic offtake. As regards quality, the manufacturers claim that within two years they can surpass that of any foreign-made fan.

The Problem of d.c. to a.c. Conversion

In India at the present time there is no standard practice in regard to the change over of consumer's appliances involved in a d.c. to a.c. system conversion. This problem was ventilated at the recent conference of managers of member concerns of the Association of Electrical Undertakings, Bombay Province, by Mr. A. P. Nadkarni, chief engineer and manager of the Cambay Electric Supply and Industrial Co. He pointed out that for present day development and for rural electrification a.c. distribution was essential. It had been suggested that consumers' appliances should be taken over at their depreciated cost and the difference in cost for new appliances being charged to the consumer. But difficulty arises when the consumer will not pay the extra cost, he said. In the ensuing discussion, Mr. Shah, of the Poona Electric Supply Co., stated that they had converted consumer's apparatus free of charge where the cost per kW of demand changed over was within a certain figure at which it was economic to do so instead of installing a rectifier substation in the locality. But he suggested that in the national interest the Government should decide that there should not be any d.c. supply in India. Some members agreed with this, and others proposed that there should be a statutory surcharge on all energy bills to create a fund for financing d.c. to a.c. conversion.

Delhi Station Completion

Except for minor works in coal handling plant and river water pumps the new steam power station of the Delhi State Electricity Board has been completed with the installation of the second 10,000 kW generating set and the fourth 80 klb/hr boiler.

Brisbane's Doubts

The Brisbane City Council's 10,000 kW packaged generating plant at Tennyson is not now expected to be in commission before late April, because the New York waterfront strike has delayed shipment of key parts, we learn. Because of this and other uncertainties in regard to commissioning dates, no early pronouncement is expected with regard to power restrictions to be introduced this winter, although it has been suggested that there should be a conference of the various electricity supply authorities. There are hopes that a new 30,000-kW generator will be ready by May or June at the Gibson Island power station of the Southern Electric Authority (formerly the City Electric Light Co.), who are also expecting a 10,000-kW packaged plant at Abermain to undergo trials within the next few weeks.

Victoria Review

The special State Cabinet sub-committee on finance has asked the State Electricity Commission of Victoria for a statement on its major uncompleted projects and its financial commitments. These facts are needed to enable the sub-committee to complete its preview of the commissions activities. Mr. Cain, the State Premier, has admitted that the committee is alarmed at the "stagnation of the Morwell briquetting project and the slowing down of the Kiewa hydro-electric plant."

PERSONALITIES

IN THE INDUSTRY

Manager of the Switchgear Department of Johnson and Phillips Ltd. since 1947, **Mr. A. Upton** is resigning shortly to go to America to take up an appointment as general manager of the Switchgear Division of a prominent American company. Mr. Upton is well known in the switchgear industry, and has previously held appointments as high-voltage designer with Ferguson Pailin Ltd. and as technical manager of Switchgear and Cowans Ltd. He is a member of several switchgear technical committees of E.R.A. and B.E.A.M.A.

Mr. A. Upton

Appointed first general manager and chief engineer of the recently formed Southern Electric Authority of Queensland is **Mr. E. S. Cornwall,** who was previously managing director and chief engineer of the City Electric Light Co. (of Brisbane) which has been taken over by the Authority.

The Dalby Electric Authority, of Queensland, has now appointed its own electricity transmission and distribution engineer at a salary of £1,265 a year. He is **Mr. A. E. Stewart,** of Brisbane. Much of the work of the Authority had previously been handled in conjunction with the State Electricity Commission of Queensland, but Dalby Council considered that the growth of its rural electrification schemes warranted the appointment of its own transmission engineer.

Three new appointments in their Atlas lighting division are announced by Thorn Electrical Industries, Ltd. Now North Western area sales manager of that Division is **Mr. F. Roberts** who has previously been area sales manager in Cardiff and assistant area sales manager in Manchester. **Mr. J. Martin,** Assoc. I.E.E., who now becomes North Western area technical sales manager, is a past chairman of the Leicester centre of the Illuminating Engineering Society and the immediate past-chairman of the Manchester I.E.S. Centre. The firm's South Western area sales manager for the Division is **Mr. J. Duffield,** who has been an Atlas lighting representative in that territory for many years.

Mr. F. Roberts

Mr. J. Martin

Mr. J. Duffield

The English Electric Co. Ltd. have appointed **Mr. L. A. Fry** as their manager for Northern Ireland and Eire. For the last six years he has operated as technical sales engineer at their Leeds branch. **Mr. A. M. Wedderburn,** who has been agent for the company in Northern Ireland since 1932 (and their representative for the previous 22 years), has retired, but will be available in a consultative capacity. His son, **Mr. W. G. Wedderburn,** has transferred to the firm's address at 41 Donegall Place under Mr. Fry. He trained with the E.E. Co. and had been connected with them until returning to join his father in 1947.

Mr. L. A. Fry

At present principal of Leicester College of Technology, **Dr. H. L. Haslegrave,** M.A., Ph.D., M.Sc.(Eng.), M.I.E.E., has been appointed first principal of Loughborough College of Technology, a post which carriés a salary of £2,500 p.a. Dr. Haslegrave was educated at Wakefield Grammar School, Bradford Technical College, and Cambridge University. He served an apprenticeship with the English Electric Co., and afterwards became an assistant engineer in the Bradford Corporation Electricity Department. For a time he was lecturer in engineering at Bradford Technical College. Dr. Haslegrave was principal of St. Helens Municipal Technical College from 1938 to 1943 and has been principal of the Leicester College of Technology since 1947.

Sir William Robinson, who recently retired from the chairmanship of the Electricity Board for Northern Ireland, has been appointed a Deputy Lieutenant for Belfast.

E. K. Cole Ltd. (Plastics Division) announce a further extension of their technical service to buyers of plastic mouldings, with the appointment of **Mr. A. W. Todd** as a technical sales representative. Mr. Todd will be mainly concerned with the interpretation of customers' needs to plastics technique. He joins Ekco from British Moulded Plastics Ltd., where he has latterly been assistant chief estimator.

Mr. A. W. Todd

Ekco-Ensign Electric Ltd. have appointed **Mr. B. D. Coffee** as their representative covering the London postal districts S.W.1 and W.C.2.

Mr. Richard Smith, who has served as one of the representatives of the Electrical Contractors' Association of Scotland on the Electrical Fair Trading Council for the past ten years, has resigned on account of health reasons. The Central Board of the E.C.A. of S. have agreed to appoint in Mr. Smith's place **Mr. James D. D. Shaw,** of James Kilpatrick and Son Ltd., Paisley. Mr. Shaw is a past-president of the E.C.A. of S.—his year of office being 1948/49.

Mr. D. McKenna, O.B.E., at present commercial manager, has been appointed chief commercial and public relations officer to London Transport. In addition, **Mr. H. W. Brooksbank,** a principal executive assistant in the commercial department, is promoted to the rank of officer with the title of fares and charges officer.

F. C. Blackwell and Co., Ltd., have appointed **Mr. Andrew Bryce** of 87 Hillside Road, Paisley, to represent them in the sale of Blaco conduit fittings in Scotland.

Messrs. Kennedy and Donkin, the consulting engineers, announce that **Mr. W. D. Wheeler,** A.M.I.E.E., M.(S.A.)I.E.E., has joined them as their chief representative in Southern Africa. He will be in charge of their office in Johannesburg, at 22 Amershoff Street, Braamfontein. Mr. Wheeler, after being educated in England, proceeded to South Africa for Metropolitan-Vickers Electrical Co. Ltd. as chief engineer. In October, 1939, he was appointed consulting mechanical and electrical engineer to the Anglo-American Corporation of South Africa Ltd., and subsequently held a number of important appointments in connection with that company's mining and industrial interests.

Alderman A. E. Bennett has been nominated by the Labour group of the City Council as Coronation Year Lord Mayor of Stoke-on-Trent. He is a member of the Midlands Electricity Board and has been vice-chairman of the North West Midlands Joint Electricity Authority.

The new post of general works manager of all works and model shops of the company has been created by Marconi's Wireless Telegraph Co., Ltd. It will be filled by **Mr. Robert Telford,** A.M.I.E.E., who was formerly assistant to the general manager. **Mr. J. P. Wykes,** A.M.I.E.E., will continue as works manager of the Chelmsford works, and **Mr. E. B. Greenwood,** A.M.I.E.E., has been appointed works manager of a self-contained factory now being built at Basildon New Town, Essex. Mr. Telford graduated in mechanical sciences at Cambridge University (Christ's College). In July, 1937, he joined the company and, after two years' experience in various departments of the company, became assistant to the works manager. When a new factory was opened at Hackbridge, near Croydon, in 1941, for making airborne radio and portable radio for the Resistance movement, he was made manager. From 1946 and for the next four years Mr. Telford was managing director of the subsidiary Companhia Marconi Brasileira, in Rio de Janeiro. Mr. Wykes joined the Marconi International Marine Communication Co., Ltd., in 1918 as a sea-going wireless operator, and qualified in electrical and high-frequency engineering at Regent Street "Poly" in 1932. Two years later he joined the research and development staff of this company, was manager of the crystal manufacturing department during the war, was appointed chief of test division in 1946, deputy works manager in 1948, and one year later works manager. Mr. Greenwood joined Marconi's in December, 1951, after holding a number of appointments with Murphy Radio, Ltd., E. K. Cole, Ltd., and Morphy-Richards, Ltd. He graduated at Leeds University.

Mr. R. Telford

Mr. J. Brimelow has been appointed manager of the Blackpool branch of Hirst, Ibbetson and Taylor, Ltd., in succession to **Mr. W. A. MacKenzie,** who is retiring after 21 years' service. Mr. Brimelow has been with the firm ever since he left school, and for 21 years has been one of their representatives. To strengthen the firm's sales force they have appointed **Mr. J. Demaine,** 23 Highfield Road, Earby, Colne, to represent them in north-east Lancashire. **Mr. E. A. Longmire,** 10 Arnfield Road, Withington, Manchester 20, to cover greater Manchester, and **Mr. J. K. Hagan,** 128 Kearsley Road, Hr. Crumpsall, Manchester 8, to cover south-east Lancashire.

In appreciation of his services as honorary secretary of the Western Centre of the I.E.E. over a period of several years, **Mr. J. Vaughan Harries,** M.I.E.E., was presented with a cheque by Mr. A. G. Warren, chairman of the centre, and Col. B. H. Leeson, president, at the centre's annual dinner and dance.

Mr. H. Hillier, O.B.E., M.I.Mech.E., M.I.N.A., engineering and technical director of G. and J. Weir, Ltd., has been awarded a James Clayton Prize to the value of £805 for his contributions to marine engineering, particularly in the field of auxiliary machinery, communicated in part in a paper submitted to the Institution of Mechanical Engineers during 1952.

Nettle Accessories Ltd. have just appointed **Mr. M. L. Barnett** as their South Western representative and he will be covering all areas served by the South Wales Electricity Board and South Western Electricity Board.

OBITUARY

Mr. Douglas Jepson, M.Sc., who was head of the Department of Metallurgy at Birmingham College of Technology since 1947, died last week, aged 51. He joined that college in 1945 as senior lecturer from Bradford Technical College, where he went in 1940 as a lecturer in metallurgy. Earlier he had been plant manager with Imperial Chemical Industries Ltd.

Mr. H. I. Yarwood, B.Sc., A.M.I.E.E., a director of Solenoids and Regulators Ltd., died on February 28, aged 46. He was educated at King Edward's School and Birmingham University, where he graduated B.Sc. with first-class honours in electrical engineering in 1928. He was chairman of the South Midland Radio Group of the I.E.E. in 1952, and had been connected with Solenoids and Regulators Ltd. for 25 years.

Mr. J. Fisher, of Pirelli-General Cable Works Ltd., died at his home at Barton-on-Sea on February 14. He had served nearly 30 years in the capacity of sales manager at the Southampton works of Pirelli-General, and the whole of his business career had been devoted to the cable-making industry. He had previously held posts with W. T. Glover and Co. Ltd., and Greengate and Irwell Rubber Co. Ltd.

We deeply regret to record the death, on February 28, at the age of 83 of **Mr. C. W. Sully,** formerly director of the Electric Lamp Manufacturers' Association, in the formation of which organisation he played a valuable part. He was, in fact, director of E.L.M.A. from 1923 until retiring in November 1940. His connection with electrical affairs was virtually life-long, for after an apprenticeship with the Midland Railway Locomotive Shops he went to Crompton's, at Chelmsford, in 1892. Eighteen months of battery work with the New York Edison Co. was followed by a long spell in South Africa, first as representative of Hubert Davies and Co., then acting for Siemens Brothers and Co. In 1910 he returned to England as export manager for Siemens, and after numerous visits abroad went to the Siemens Lamp Co. in London. In 1914, the first meetings of the Tungsten Lamp Association were held, and in 1918 Mr. Sully and Mr. J. Y. Fletcher were present when the E.L.M.A., replacing the T.L.A., was formed. In the following year Mr. Sully was appointed to the main Committee, and later in the year became vice-chairman of the Association. He was chairman for 1920, and was appointed director in January 1923, the year before the E.L.M.A. Lighting Service Bureau was formed. He was also elected president of the I.E.S. in 1933. The funeral takes place at Golders Green Crematorium at 11.30 a.m. today, March 5.

Mr. C. W. Sully

Mr. F. W. Knight, chief works chemist to Albright and Wilson Ltd. until his retirement through ill-health last summer, died on February 23, aged 59.

Mr. J. S. Smith, who, until retiring in 1950 was manager, North West area for the Marconi International Marine Communication Co., Ltd., died on February 21, aged 64.

Mr. E. L. Joseph, founder and chairman of Ozonair Ltd., died on February 24, aged 84.

NEW LITERATURE

Electric Welding, Heating and Electro-Plating

Edited by E. Molloy

ONE of the Practical Electrical Engineering series of books, under the general editorship of Mr. E. Molloy, this volume covers, necessarily briefly, the fundamental principles of automatic welding processes, arc welding, stud welding, resistance heating, space-heating and air conditioning, electric furnaces, h.f. heating and industrial electro-plating. The text is clear, and aimed at the practical man, and in consequence much of the fundamental theory underlying the welding process has been omitted. On the whole, however, the volume is well up to the standard already set in this series. Published by George Newnes, Ltd., 148 pages, 6 in. by 9 in. Price 17s. 6d.

Electricity Tariff Handbook

THE compilation in handy form of the tariffs of all the area boards is the aim of this new handbook. To this end the aid of Mr. V. A. H. Clements, assistant commercial manager, B.E.A., has been enlisted. We are aware that the presentation of these tariffs in easily assimilable form presents many difficulties, and in this edition some effort to counter them is apparent, but we feel that the result is still a little puzzling. It is also unfortunate that the tariffs of the London and South Eastern Boards are not included (presumably because they are not standardised), nor, of course, are the three major tariff announcements made in recent weeks. We are also not happy about the omission of the North of Scotland Hydro Electric Board. Nevertheless, this handbook should prove useful. Published by Iliffe and Sons, Ltd., 64 pages, 8½ in by 5½ in. Price 7s. 6d.

A New Approach in Cooker Design

DESIGNED to combine low price with top quality and attractive selling points, the new model 290 of the Jackson Electric Stove Co., Ltd., achieves a startling but successful break with convention. As the accompanying illustration shows, the cooker reflects many features of modern industrial art, and yet in spite of its compactness, demonstrations have confirmed the manufacturer's claim that it cooks a meal for six to eight people.

Probably the outstanding feature of this new cooker, after appearance and quality have been considered, is the price. It retails at £22 17s. 6d., with the splash plate an optional extra at 9s. 6d. Three finishes are offered: cream with pale green legs; all cream; or white with pale blue legs.

Unit Construction

Interchangeability of electrical parts has been watched, and the cooker as a whole complies with the E.D.A. specification on this feature. Construction throughout has been based on treating the different sections of the cooker as individual units, and then covering these only relatively lightly.

The oven is built from welded sheet steel, with slag wool lagging. Elements are of conventional design and are interchangeable with the 190J and 192J Jackson cookers. For the oven door two pieces of sheet steel are used, and they give sufficient flexibility to avoid the need for soft packing as a guarantee of good seating. Oven internal dimensions are 12⅝ in. high by 13⅝ in. by 12 3/16 in., giving a total cubic capacity of 2,100 cu in. The electrical loading of the oven elements is 1,780 watts.

A lift-off type pressed-steel hob is used, and it covers an 8 in. dia, 1,800 W boiling plate and a 10⅛ in. by 8 in. 2,000 W grill boiling plate. Overall dimensions of the hob are 16 in. by 21 3/16 in., the cooker size overall being 36 in. high to the hob, by 17⅞ in. by 22 3/16 in. Below the hob there is a hot cupboard.

Running across the cooker behind the hot cupboard there is a sheet-steel box, and this contains the complete wiring and controls, with the exception of the oven element connections. This method of construction enables all the wiring, including controls and boiling plate sockets, to be removed from the cooker as a single assembly. There is also provision for the removal of switches and the thermostats as separate items.

Jacksons' Two-Ninety

Switches and controls are housed near the top of the cooker, and a neon indicator is provided as a check on thermostat position. Selling points for the housewife include a towel-rail on each side of the cooker, and rollers on the rear legs to permit movement away from the wall for cleaning purposes. The removable interior sides of the oven and the lift-off hob also facilitate cleaning.

The removable oven side walls are clearly seen below

6,500 h.p. MARINE GAS-TURBINE

Unusual Machine Developed by English Electric Ltd.

AN interesting marine gas-turbine unit, designed to develop 6,500 h.p. has now completed an extensive series of tests at the Rugby works of the English Electric Co. The unit was originally based on steam turbine construction as it was thought at the initiation of the project in 1945-6, that the light-weight units might not have sufficient life or reliability for the stringent requirements of the Admiralty. However, it was soon discovered that the design and manufacture of a large gas turbine to operate at temperatures of 200 to 300° F above current steam practice presented formidable problems and it was not until 1951 that the completed unit was ready for testing. In the interim, the development of the light-weight units had gone rapidly ahead with the result that the original project for installing the large unit in H.M.S. *Hotham* was dropped in favour of the lighter machines. The set has, however, provided ample data which will be invaluable in the construction of future gas turbines.

Design Details

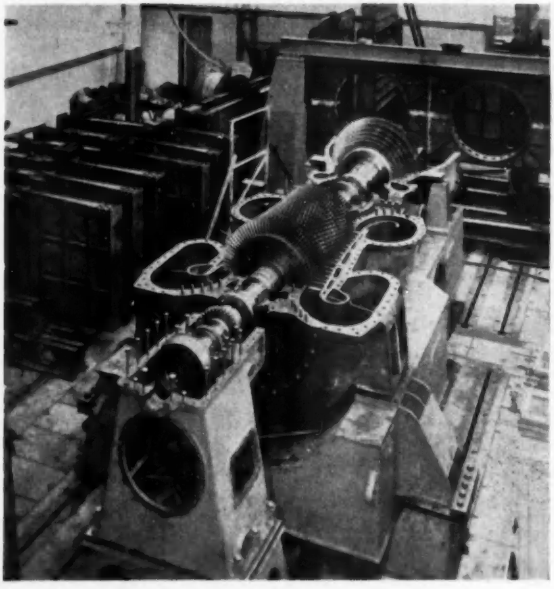
The basic operating cycle is unusual in that it is of the parallel flow type, and was chosen as the power turbine could be run at 5,600 r.p.m. needed for direct coupling to the ship's alternator, and manoeuvring and power output could be easily controlled without interfering with the compressor system. The compressor itself is a fifteen stage axial machine designed to give 128 lb/sec mass flow of air at a pressure ratio of 4 : 1 when driven at 4,000 r.p.m. The blades are precision stampings of aluminium-bronze, hand polished. Driving the compressor is the charging set turbine rated at 13,700 h.p., and this is geometrically similar to the output power turbine which is, however, scaled down in the linear ratio of 0·688 : 1.

Air cooling is provided for the turbine rotors. the air being tapped off from the main cycle air immediately after the compressor, and after filtering it is fed into the centre of the rotor through radial holes located between the labyrinth glands on the rotor shaft. This air is then distributed outwards from the centre of the rotor through a number of small holes feeding into the blade roots and the disc covers. The system of cooling has been found so effective that the existing method of building up the rotors by welding from separate forgings of FCB(T) will in future be discarded in favour of using a single forging of ferritic material.

Six combustion chambers operating in parallel are used, four supplying the charging set and two for the power turbine, and a new form of flame tube construction, invented by technicians of the Shell Petroleum Co., and further developed by the English Electric Co., is used.

Considerable ingenuity was needed in the design of the heat exchangers to pack into the limited space allowed by the engine room dimensions of H.M.S. *Hotham*.

Automatic control has been introduced which permits full control of the power turbine output by means of a single master operating lever.



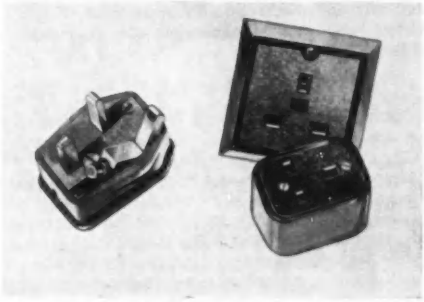
The heavy structure adopted is shown in this view of the charging set compressor and turbine

The BUYER'S *Column*

13 amp Plugs by D.S.

THE introduction of a range of flat-pin 13 amp fused plugs conforming to B.S. 1363 has been announced by D.S. PLUGS LTD., Ordsal Electrical Works Ltd., Manchester 5. As readers will recall, the company has for a number of years marketed a domestic plug featuring the D.S. fused pin. In the new plug it will still be possible to change the fuse without the use of tools for the company have incorporated a special hinged pin to which the fuse is clipped. Apart from ease of replacement, this arrangement also obviates the danger of persons interfering with the wiring.

A hinged pin facilitates wiring of this new plug



The fuses are to B.S. 1362 and are interchangeable with standard makes. All terminals in the plug are removable for easy wiring. The plug is available in the standard brown finish or in white.

At the same time the company is also introducing a range of unswitched sockets, both surface type and in two patterns of flush type, with either a plastic front or a metal front plate. These are all fully shuttered and have porcelain insulators of minimum projection for easy wiring.

Coal Sampling

THE need for accurate coal sampling in generating stations has brought about the introduction, by INTERNATIONAL COMBUSTION LTD., 19 Woburn Place, London W.C.1, of a new pattern sampler which can be readily applied to both new and existing belt-conveyor systems.

The company say that at a certain power station in the London area where this sampler has been in operation over a number of years, tests have proved that the samples obtained conform to the limits of accuracy recommended by the British Standards Institution.

Basically, the sampler embodies a hinged scraper arm worked by a power-operated thruster through link mechanism, which is carried across the width of the belt. The scraper removes a cross section of material and delivers it into a side chute. The lower section of the scraper arm is hinged and spring-loaded so that during the return movement of the arm the scraper rides back over the material without disturbing it.

Draughtsmen's Equipment

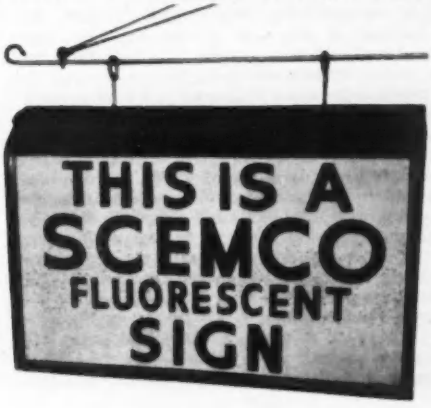
IN recent times draughtsmen's equipment has appeared on the home market bearing the trade mark of "Libra."

The quality of the boxwood scales so far available is due to new manufacturing processes evolved by HILGER AND WATTS LTD., 98 St. Pancras Way, London N.W.1, which produce scales with clean, fine markings, a pleasant durable finish and an accuracy well above the relevant British Standard specification.

The process involves the preparation of a precision master under laboratory conditions with an accuracy of 0.001 in. per foot. An accurate reproduction of this scale, free from individual errors, is carried by selected, well seasoned, West Indian boxwood blanks, which are specially selected for stability and hard wearing qualities.

The Scemco Fluorescent Sign

THESE new signs are supplied by SCEMCO LTD., 18 Soho Square, W.1, in two sizes—one for 3 ft 30 W two tubes and the other 2 ft 40 W two tubes. For outdoors these signs are double sided and give an exceptionally good lighting effect when lit and are economical to use. A patented reflector inside evenly distributes the light. The 3 ft sign is 25 guineas list, and measures 36 in. long and 24 in. deep and the 2 ft 40 W sign is 25 in. long and measures also 24 in. deep, and is 22 guineas list. The modern streamline shape slopes from a width of 9 in. at the top to a 1½ in. base, and the whole fitting part is finished dark copper bronze.



Ediswan Coronation Equipment

THE EDISON SWAN ELECTRIC CO. LTD., 155 Charing Cross Road, W.C.2, have produced many colourful and attractive devices for decorative illumination during Coronation year. Three types are available, a crown, a laurel wreath surrounding the Royal cipher, and a shield with the armourial bearings of the Royal Standard.

The crown and the shield are in two sizes, 3 ft 3 in. or 1 ft 6 in. in height, whilst the laurel wreath will be supplied either 3 ft or 2 ft high.

The larger units are moulded in full relief in papier maché and the smaller units in hard rubber, both being finished in full colour.

The devices are supplied fully wired, complete with waterproof B.C. lampholders to take Royal Ediswan colour-sprayed lamps, and each device is provided with a convenient fixing batten at the back.

Apart from these moulded devices, Ediswan offer flat cut-out hardboard crowns and the Royal cipher, each 3 ft 4 in. in height, sprayed red and supplied fully wired complete with waterproof B.C. lampholders to take Royal Ediswan white or colour-sprayed lamps, with or without Garland reflectors.

These Garland reflectors are of corrugated metal, 7 in. diameter, with a high silver mirror finish. They are specially made to fit over the lampholders on the various devices, or on Ediswan illumination strip, where they are secured by a spring.

Efficient Ventilation

AN old-established firm in North London, the LONDON FAN AND MOTOR CO LTD., 91a Burghley Road, Tufnell Park, London N.W.5, are at present concentrating on the production of a range of propellor fans suitable for ring, duct or diaphragm mounting.

These "Breeza" and "Trojan" fans are fitted with totally enclosed motors of a rating suitable for their particular duty, which are made by the company. They can be used in ambient temperatures from 30° to 120° F and comply with B.S.S. 168 and 170 (1939). Breeza flameproof fans are suitable for the removal of cellulose and petrol fumes (the single-phase motors having separate non-flameproof condensers for fitting outside the dangerous area.

Both types of fan are fitted with universal impellers moving equal volumes of air in either direction. A.C. fans are readily reversible on site except the Trojan single-phase types, which require capacitor motors at extra cost.

A.C. motors are series wound, whilst three-phase a.c. units are of standard squirrel-cage design. Single-phase Breeza fans have capacitor 'start' and 'run' motors, with separate condensers. Standard Trojan fan motors for single-phase have slightly shaded-pole running windings.

A New Range of Fittings

THE 700 series of lighting fittings using standard 284 m.m. double-ended tubular lamps by LINEALUX LTD., 142 Liverpool Road, London N.1, has recently been enlarged by models being available moulded in six colours in all insulated plastic.

The attractive designs are available in white, ivory, cream, pearl grey, eau-de-nil, and pink, and include models with push-button switches with circular base plates and with Perspex shades either in self-colour or in contrasting colours. All modes are supplied complete with glass tubes and may be fitted with adjustable clip attachments for mirrors and bed-heads at an extra charge of 5s. 6d. including tax.

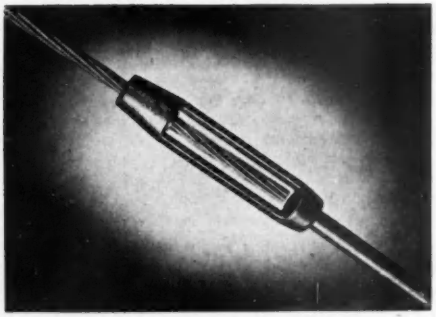
The New C.C.L. Stay Rod

CONSIDERABLE saving in time and money are claimed to be effected when the new C.C.L. Stay Rod is used in line erection work.

Announcing its introduction, CABLE COVERS LTD., St. Stephen's House, Westminster, S.W.1, say that it will supersede all tubular and bow-type rods, its salient features being that it is cheaper, that its use speeds erection time, thus saving costs, that there is a complete elimination of splicing and a saving of stay wire, and that the method gives a stay which has a longer life.

The head itself is drop forged and the rod screwed and welded into the forging. It is made from 28/38-ton quality mild steel. Ultimate tensile strength of the rod as detailed in B.S.S. 1320/1946.

The stay rod is complete with a 4-in. square (or 6-in. square) baseplate and a nut and lock nut suitable for use with 7/14, 7/12, 4/8, 7/10 or 7/8 s.w.g. stay wire.



C.C.L.'s stay rod is claimed to save time and money

New Lampholder Shields

SUPERSEDING pattern S.1158A brown, and S.1168 cream shield is the new Bakelite shield for b.c. lampholders, which the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, W.C.2 have just issued.

Overall length of this new shield (catalogue number S.1258) is 1⅝ in. In the bell-shaped contour of the lampshield three ventilating slots are provided.

List prices are as follows: S.1258 brown, 4s. dozen; S.1258 cream, 6s. dozen.

The Trolley-phone

WE have been informed of an amendment in the price of the "Trolley-phone" system by CLIFFORD AND SNELL LTD., Carshalton Road, Sutton, Surrey. This should now read £105 ex works not £130 ex works as stated in our issue of February 5.

TRADE PUBLICATIONS

AERIALITE LTD., Castle Works, Stalybridge, Cheshire, advise us that the retail price of Part No. 135, trapeze copper earth rod has been increased from 5s. to 5s. 6d.

ADHESIVES.—A ready-reference guide to the choice of Aero Research adhesives is in the form of a folder card and is available from Aero Research Ltd., Duxford, Cambridge.

DUST CONTROL.—Dallow Lambert and Co., Ltd., Spalding Street, Leicester, England, are specialists in the design and manufacture of dust control apparatus. Their range of products is described in catalogue No. 25 just issued.

POWER STABILISATION.—A folder giving details of the Ediswan R1103 stabilised power supply unit is available from the Edison Swan Electric Co. Ltd., 155 Charing Cross Road, London W.C.

Bigger Hoover Washing Machine

THE lifting of certain restrictions on the use of mild steel has played an important part in enabling Hoover Ltd. to produce a new washing machine holding substantial advantages over their earlier model. In view of the undoubted success of the first version there has been little departure from that machine's basic design, but the added features of the new model should establish its popularity at least on the same level as its forerunner.

It will be remembered that the external casing of the first machine consisted of four side panels, due solely to the company being restricted to using 18 in. wide mild steel strip. In the new model they have been able to use sheet metal, so that the case is now continuous on three sides. Apart from facilitating production, this has contributed to the increase in tub size—which will now hold 8½ gallons of water against the 6¾ gallons capacity of the earlier model. In consequence, it has been possible to increase from 3½ lb to 6 lb the weight of clothing the machine can handle.

To provide extra power for the increased capacity, the motor used is rated at ¼ h.p., double that used previously. This higher rating, however, has also been required to power an additional feature, not present in the older machine, which should enhance its value considerably in the eyes of the housewife. Whereas in the first model, the tub was emptied through a length of hose running from its well, in the new version a pump has been incorporated. It empties the tub through an outlet near the wringer, pumping out 8½ gallons in 2½ to 3 minutes.

A four-impeller centrifugal type, the pump is driven direct from the motor, compared with the pulsator's belt drive. Although it is, therefore, continuously in operation when the machine is in use, the water flow is normally "short-circuited" by a short length of rubber hose, which returns the water back to the tub. To empty the tub this hose is detached at one end and fastened into an extension piece provided with the machine for both emptying and filling. As in the previous model, the motor is a 1,400 r.p.m. shaded pole type, mounted on rubber insulating bushes, although it can be bonded if required.

The new machine has almost double the washing capacity of its predecessor

Finished in white enamel, with maroon and white handle and name plates, the case contains a cord storage compartment complete with clip to hold the plug top. A splash cover is also a new incorporation, fitting over the tub and sliding under the wringer when not required. The wringer itself has been lengthened, having 10 in. rollers, an increase of 2 in., and is now locked in both storage and operating positions. Unidirectional running wheels have been fitted to run at right angles to the force exerted when using the wringer. Yet overall dimensions of the machine have increased only fractionally. Retailing at £35, plus £14 17s. purchase tax, its introduction to the public coincided with the opening of the Ideal Home Exhibition on March 3.

The WEEK in NEWS

Further Tariff Standardisation in N.W.

Details to be Announced in Near Future

THE North-Western Electricity Board's proposals for the removal of a number of anomalies in their tariffs, untouched in previous standardisation measures, are expected to be announced in the next week or two. They have been agreed with the B.E.A. and Area Consultative Council. Tariffs concerned include those relating to the use of electricity for lighting, heating and power in commercial, small industrial, institutional and farm buildings. The small industrial consumers affected exclude all those charged on the Standard Industrial Tariff. The Board's aim is to secure an additional revenue of about £500,000. These changes will involve some 1,300 different tariffs which have been in force to date, and are due to become effective as from April 1.

The above proposals were, of course, prepared before the recent announcement increasing the price of coal. The Board's chairman stated on Monday that prices of electricity in the Area would not be increased. The Board would "take a chance" and try to offset costs by increased sales in off-peak periods.

Other Comments on Rise in Coal Prices

ON the subject of coal costs, a statement was issued by the B.E.A. last week immediately following the National Coal Board's announcement of an increase in coal prices. The rise in the price of coal, it was stated, will add about £10 million to the annual bill for the generation of electricity. Part of that extra cost will be recouped from consumers whose tariffs are subject to coal cost variation clauses, but domestic and other tariffs not governed by the automatic adjustment will have to be correspondingly increased. The statement added that Area Boards are reviewing their financial positions and will announce increased charges after conferring with the Consultative Councils.

A similar statement issued later by the London Board revealed that there was no immediate intention of raising general tariffs in that area. The Board warns consumers, however, that if coal costs and wages continue to rise, the price of electricity must also increase.

Consumers in the E. Midlands Board Area will not be so fortunate as Londoners. Coal price increases make an increase in electricity tariffs inevitable, Mr. C. R. King, the Board's chairman, has stated. It was hoped that charges could be kept at existing levels, but the additional burden of nearly £850,000 was in the nature of the proverbial "last straw." Detailed proposals for increasing tariffs were discussed by the Board last Monday and the Consultative Council will be informed in due course.

E.C.A. AND S. WALES BOARD TO CONFER NEXT MONTH

MEMBERS of the electricity supply industry in S. Wales and electrical contractors are to gather at the Esplanade Hotel, Porthcawl, on April 24, for their third joint conference and dinner. This function is being organised by the E.C.A./S. Wales Electricity Board Liaison Committee. Details of the conference have not yet been finalised, other than that there will be three papers on matters of mutual interest, that it will open at 11 a.m., close at about 5 p.m., and the dinner will follow at 7 p.m. These joint conferences have proved most successful previously, not only in S. Wales, but in similar circumstances at other West Country Centres.

E.C.A. CONFERENCE

SOME details of this year's annual conference of the Electrical Contractors' Association were announced last weekend. The conference is to be held at Bournemouth between June 22 and 24. Registration forms should be returned to the secretary, Mr. L. C. Penwill, at 14 Bedford Row, W.C.1, as soon as possible.

The First Half-Century

Another rival to Marconi's is the Jackson system, which has much in common with it, and which is being utilised in Somaliland by Lieutenant Jackson with a view to the earlier subjugation of the Mad Mullah. Lieutenant Singleton depends on balloons for his "mast," but of his success it is too soon to speak. Wireless telegraphy was found not to answer in South Africa, owing, it is said, to the quantity of iron in the rocks; whether it will be more fortunate in the eastern part of the continent remains to be seen. —*From our issue of March* 5, 1903.

Arguments for One Welsh Authority

CAERNARVONSHIRE STATES ITS CASE

THE major part of Caernarvonshire County Council's arguments for the establishment of a separate administration in Wales for the generation and distribution of electricity have been included in a letter to a rural council which sought full information on the subject. All Welsh councils have been asked to express their views before Caernarvonshire's resolution goes before the Association of Welsh Local Authorities at their meeting later this month.

Pointing out that the move is only part of a general view that Wales should be treated as a separate entity for all administrative purposes, the County Council lists its arguments under four sections. In the first instance, it is stated, the great natural resources of Wales mean that S. Wales can generate electricity cheaper than any other Division of the B.E.A., but the fruits of this advantage are not gained by the Welsh but by the English Divisions. Administrative costs forms the basis of the second argument—with one electricity board for Wales, duplication of officials in London would be eliminated with consequent saving to consumers.

The fourth point raised was—that in 1944 the Welsh Reconstruction Advisory Council expressed the view that Wales should have its own Electricity Board. Finally Caernarvonshire is convinced that a Welsh Board would result in the claims of agriculturists, and rural areas in general, being given due and urgent consideration.

NEW ELMA CENTRE IN NEWCASTLE

A NEW Lighting Centre has been opened in Newcastle. Although following the pattern of E.L.M.A's Lighting Service Bureaux in London, Leeds and Glasgow, it has been decided not to call it a Bureau as the premises' size hardly justifies the description, and compared with the three large Bureaux might be misleading. There are, however, sufficient demonstrations to illustrate the basic principles of lighting, and the restricted space proves how little room is required in a contractor's showroom or service centre to provide a perfectly adequate lighting service department. Manager of the new Centre is Mr. R. Fothergill and his address is Northgate House, St. Mary's Place, Newcastle-on-Tyne.

Diesel Efficiency and Waste Heat

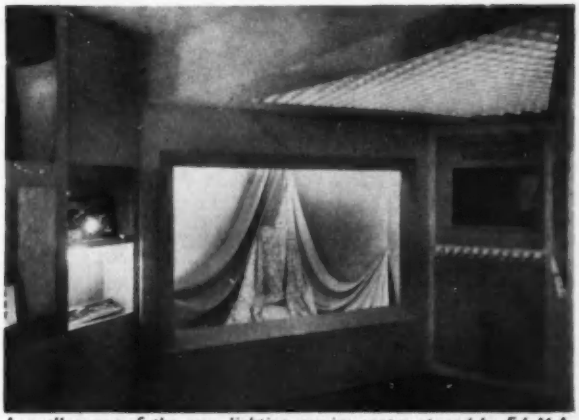
HOW efficiently are diesel engines being used? That they can be run at up to 81% efficiency was demonstrated last week in a film *The Diesel Generator as a Composite Heat and Power Unit*, produced for Shell-Mex and B.P. Ltd. by the Merlin Film Co., Ltd. This film is designed to encourage greater efficiency in the use of diesel engines by utilising waste heat recovery. Fine exemplary installations of this nature are shown in the film, ranging from domestic to industrial applications, accompanied by an introduction on the basic principles involved. The film runs for 40 minutes and is available from Shell-Mex and B.P. Ltd. gratis.

Electric Trains Over the Pennines in 1954

ELECTRIC trains should be in use on the Manchester-Sheffield-Wath line next year, stated Mr. John Elliott, chairman of Railway Executive after he had visited the Woodhead tunnel last Saturday. The tunnel itself would probably be opened in July. Main efforts in the electrification of the line have been devoted hitherto to that part on the Manchester side of the Pennines, and to date a 33 kV e.h.t. cable has been laid between Manchester and Woodhead. In addition the longest portion of concrete foundations for o.h. equipment has been laid and some sub-stations built.

Public Speaking Finalists

YORKSHIRE was the latest area to hold its eliminating contest for next month's finals of E.D.A's Public Speaking Competition. Entrants from the Yorkshire, E. Midlands and N. Eastern Electricity Boards took part. Winner of the seven competitors in the men's section was Mr. J. Crawte, of the Grimsby sub-area, who spoke on "Public Relations in Electrical Salesmanship." In the women's section, Mrs. B. D. Wright, of the Wakefield sub-area gained first place with her speech on "Gas and Electricity."



A small corner of the new lighting service centre opened by E.L.M.A. in Newcastle

EDUCATION FOR ELECTRICITY STAFFS

URGING administrative and clerical employees (particularly the younger ones) in the electricity industry to study with a view to obtaining suitable qualifications, to assist in getting promotion, the National Consultative Committee of N.A.L.G.O. have issued a statement on education policy in this field. All the area boards offer facilities in this connection and it is suggested that National Certificates in Commerce are a suitable first step. The commercial staff members might seriously consider taking courses in order to obtain the B.Sc.(Econ.), although many area boards are placing considerable weight upon the possession of the H.N. Certificate in Electrical Engineering—the N.A.L.G.O. committee maintains that it would be detrimental to the industry to place too much importance on engineering qualifications while ignoring the commercial aspect.

Silicones on View

AN exhibition entitled "Silicones for the Electrical Industry" is being organised by Midland Silicones, Ltd., at their premises in Upper Brook St., London. It will take place between the 17th and 21st of this month. Invitations may be obtained from the company, who have had the co-operation of leading insulation manufacturers in the show's organisation.

OFFICIAL PUBLICATIONS

BRITISH STANDARDS. *B.S.* 1050: *Visual Indicator Lamps for telephone switchboards and allied purposes: B.S.* 1611; *Glossary of colour terms in science and industry: B.S.* 833: *Radio Interference Suppression for Motor Vehicles and Internal Combustion Engines.*

IRON AND STEEL DISTRIBUTION (*Amendment No.* 3) ORDER, 1953. S.I.271. *Increases tinplate obtainable without authorisation, and ends some prohibitions in use of iron and steel—counter displays, signs, etc.* H.M.S.O. 2d.

COMMAND PAPER 8776: *U.S. Arrangements for Expenditure of Counterpart Funds derived from Aid under Mutual Security Act.* H.M.S.O. (see page 438).

With the object of stimulating interest in some of the achievements of electrical engineering, the Electrical Dept. of the Polytechnic, Regent St., London, produced this window display. Photographs and apparatus representative of the frequency range from d.c. to 10,000 Mc/s was shown, and attracted considerable attention

All-electric Exhibition in Montreal

NEWS of the Canadian budget last week confirmed the opinions that industry and commerce in that Dominion are thriving, and thus it comes as no surprise that the U.K. Trade Commissioner in Montreal is recommending that British manufacturers of electrical products should be encouraged to take part in an exhibition next October. The exhibition concerned is the 1953 Eastern Canada All-Electric Show, which is to be held at the Palais du Commerce, Berri Sq., Montreal, between October 5 and 8.

The show will be divided into three sections—the first dealing with educational services, hydro-electric services, wiring devices, general or power equipment, lamps and fixtures; the second with radio, TV and electronics; and the third with electrical appliances. It will be a trade show, but the public is to be admitted in the evenings on complimentary passes. Applications for space (at the rate of $1.75 per sq ft) should be made to Eastern Canada Exhibitions Inc., 423, Ontario, E. Montreal.

Dispute Over Cost of District Heating

RESIDENTS at Bemerton Heath, in Somerset, are seriously concerned at the cost of a local district heating system. The rate at present in force is 12s. 6d. per week, but the Council has stated that to be self-supporting the cost would have to be 15s. 9d. per week. The loss on the system during the current financial year is over £4,000. Doubt was raised as to whether the scheme was being run on sound business lines like electricity or gas, where consumers paid for what they used. It was suggested that meters be installed, although the chairman pointed out that the cost would be about £100 or £150 per house. Response to the suggestion was almost unanimous. Tenants asked that a public inquiry be held to consider the working of the district heating system.

Interlude for Tennis

TO tennis enthusiasts, Wimbledon has but one significance—its world-famous centre court, arena for the All-England championships. Less is known of the work preceding this annual tournament and an entertaining glimpse of behind-the-scenes activities was provided by Lt. Colonel A. D. C. Macauley, guest speaker at last week's Batti-Wallahs luncheon. Colonel Macauley is secretary of the All-England Club.

ROYAL SOCIETY AWARDS 1952 ART BURSARIES

NAMES of successful candidates in the Royal Society of Arts' Industrial Art Bursaries Competition of 1952 were announced last weekend. Altogether 233 candidates competed, a record entry, for the Bursaries totalling £2,225 in value. The two sections in which we are particularly interested concerned domestic electrical appliances and electric light fittings. In the former section, the award of £150 was won by Mr. Geoffrey Gale, 22-year-old student at the L.C.C. Central School of Arts and Crafts. The Bursary valued at the same amount in the light fittings section has been awarded to Mr. Leonard Summers of the Birmingham College of Arts and Crafts, who incidentally was also awarded associate membership of the Society.

Winning and commended designs in all sections are to be exhibited at the Society's House in John Adam St., W.C.2, between May 11 and 22. Also on view at the same display will be the reports submitted by previous Busary winners on their tours abroad.

Arrangements are well in hand now for the 1953 competition, in which it is hoped to include other sections. Full particulars are expected to be announced early next month.

Damages in Case of Storage Heater Fire

DAMAGES of £685 3s. 6d. were awarded recently in the Dublin High Court against Technico, Ltd., manufacturers of a thermal storage heater marketed in Eire. The case was one in which a heater installed in a private house had been draped with blankets and left in this condition all night. The blankets effectively muffled the heater and its surface temperature became high enough to catch them on fire, and subsequently the room in which they were placed.

The President of the High Court held that the defendants in the case had a legal duty to inform people who installed the heaters in their houses of the danger of interfering with the free emission of heat from them. He held that the fact that the company distributed only to the trade did not relieve them of this duty. Stay of execution was granted.

Storage heaters described in our recent article all work in conjunction with thermostats.

Suitable Installation for Assembly Work

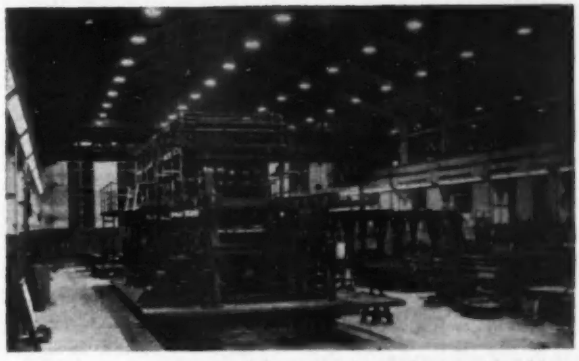
INTRICATE work involved in the erection of large printing presses at the Water Lane works of R. W. Crabtree Ltd., demanded, above all, a well diffused general illumination. In planning the lighting scheme, Benjamin Electric Ltd. decided to use a combination of tungsten and fluorescent lamps. Thus a relatively closely spaced overhead installation of R.L.M. reflectors was provided, together with almost continuous side lighting by Type G (Angle) Flurolier fittings. The machinery itself caused considerable light obstruction to inner parts and the working zone extended to all heights up to about 20 ft, but both contingencies were met with a marked degree of success. The 750 W R.L.M. reflectors have been mounted at a height of 31 ft, and the 5 ft 80 W Flurolier fittings at 16 ft.

RESEARCH INTO FLAME RADIATION

THE work of the Flame Radiation Research Joint Committee was discussed before the Institute of Fuel last week. Opening proceedings, Prof. O. A. Saunders said the object of investigations at Ijmuiden, Holland, was to improve the efficiency of industrial furnaces. Results obtained had led to a better understanding of heat transfer processes, especially of heat transfer by flame radiation. Investigations on a scale approaching that of furnaces actually used in industry had been carried out in Ijmuiden over the past four years. A description of experiments was given by Mr. M. W. Thring.

Western Centre Dinner

THE Western Centre of the I.E.E. held their annual dinner and dance in Bristol on February 20 when over 200 members, their wives and guests attended. Guests were received by the President, Col. B. H. Leeson and Mrs. Leeson, and by the Centre's chairman, Mr. A. C. Warren and Mrs. Warren. Col. Leeson, replying to the toast of the Institution, reminded his audience that electrical exports were now greater than those of any other industry except motors, and paid for more than half our imports.



Combined use of tungsten and fluorescent lamps for assembly of large printing presses at the Water Lane works of R. W. Crabtree Ltd. The installation was planned by Benjamin Electric Ltd.

Screen and Radio Stars at new Philishave Launching

AN amusing shaving competition highlighted the introduction to dealers of the new two-head "BI-AX" Philishave dry shaver earlier this week.

Eamonn Andrews, Raymond Glendenning, Henry Hall and Eric Robinson of B.B.C. fame and boxer Freddy Mills all attempted a one-minute shave with the new shaver. Despite a handicap on account of his famous moustache, Raymond Glendenning was judged by screen star Anne Crawford to have had the smoothest shave.

Introducing the new shaver, Mr. Hoffman, chairman of the Philips Group, struck an original note in composing a witty poetic slogan to round off his speech.

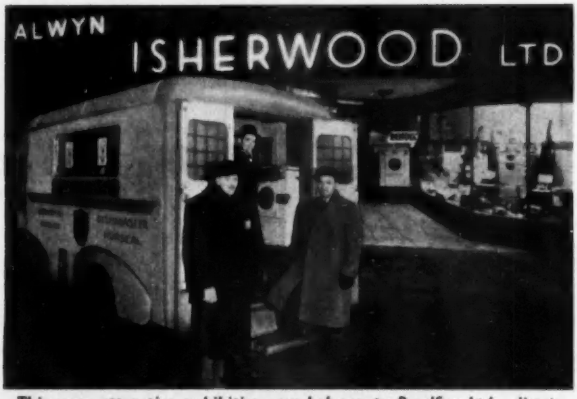
Review of 1952

SHAREHOLDERS of the English Electric Group of Companies are to receive a pictorial survey of 1952 produced in the form of a 48-page brochure. After a mere two pages of text, by way of introduction, the year's achievements have been presented in pictures and captions. Large and small plant and instruments, traction, aircraft, domestic appliances, welfare and education, radio and research are all included. The brochure will also be given to visitors to English Electric factories and offices at home and overseas.

Winner of a national recipe competition organised by Alfred Bird & Sons, Ltd., was presented with an English Electric 76A refrigerator. Picture shows the winner being shown the features of the refrigerator at the London Board's Penge showroom.

Kerry's Find New Premises in Exeter

WE note that in the ten weeks or so which have elapsed since fire destroyed the Exeter premises of Kerry's, Ltd., arrangements have now been completed whereby a full range will be available to customers in the West Country at the company's temporary building in North St., Heavitree. A full service to customers came into operation from that address on Monday. In the intervening period business has had to be conducted from London. The gutted building in Alphington St. is to be replaced by a new and modern warehouse, which it is hoped will be completed by the end of this year.



This very attractive exhibition van belongs to Bradfax Ltd., distributors of such well-known products as the Dishmaster, Bendix washing machine, and Hurseal radiators and Oprim ironers. The vehicle carries a wide range of the appliances dealt in and in this picture is shown outside the new Wakefield premises of Alwyn Isherwood Ltd.

NEWS IN BRIEF

The N-Western Electricity Board are to rebuild their Penrith offices and showrooms.

Members of the Engineers' Guild are calling a meeting at the Station Hotel, Stafford, on March 13 to discuss the formation of a centre at Stafford.

The 1953 Convention of the Association of Mining Electrical and Mechanical Engineers is to be held at Scarborough between June 9 and 12.

B.T.H. (Willesden) Long Service Association held its annual re-union at Wembley last Thursday. Thirteen members qualified this year for 30-year certificates and 17 for 25-year certificates.

In our note on available thermal storage heaters last week, the price of the Aberdare Electric models should have been given as £12 10s. 3d. (1·5 kW) and £11 7s. 7d. (1 kW).

First annual dinner of Incorporated Plant Engineers took place at Cafe Royal, London, on January 30. Among guests were Sir John Maud, Sir Norman Kipping, and Messrs. W. L. Boon, R. M. Wynne-Edwards, and A. Clifford Hartley.

Record number of 750 attended Ekco Social and Sports Club children's Christmas party on January 31.

Telcon's annual presentation concert took place in the works' canteen before an audience of 400 last week.

Questions in Parliament . . .

Future of the B.I.F.

Any suggestions that the future of the British Industries Fair was in jeopardy were dispelled last week in written answers given by the President of the Board of Trade. Asked to make a statement on the matter, the Minister told the House that far from the Coronation year Fair being the last, immediately it was over, work would begin on preparations for the 1954 exhibition. This would be held in London and Birmingham between May 3 and 14. In the meantime, the Exhibition's Advisory Committee was studying the best method of organising the Fair in the longer term.

The following day Mr. Bossom asked what steps were being taken to prevent a repetition of the losses made on the Fair's London section. Mr. Thorneycroft said all practical measures were being taken to put the income and expenditure on a sound basis, but the losses to date by no means indicated that the Fair had been a failure.

Smoke Abatement

Mr. Ellis Smith asked last week whether the degree of smoke which constituted a nuisance could be clarified and whether inspectors could be appointed to deal with the problem. The Minister of Housing stated, however, that the problem of smoke abatement was not one which could be solved by legislation. Smoke of such colour, density or content as may be prescribed could already be regulated by bye-laws. Inspectors would not be appointed.

Replying to the same questioner on the same day, Mr. Marples confirmed that systematic measurements of atmospheric pollution were being made in Stoke, Manchester and Stockport and other towns.

Australian Imports

Because Australian import quotas could not be tied to any one country, Mr. Mackeson told the House last week that no reliable estimate could be given of the likely value to British trade of recent relaxations. Asked if the Government were making any new representations to Australia on the subject, he assured the House that constant talks were taking place.

Monopolies Commission

The fact that certain statistics and information published in reports of the Monopolies Commission had been useful to foreign competitors was mentioned at question-time in the House last week. The President of the Board of Trade was asked whether industries concerned could see the reports before publication so as to guard against such eventualities. Members were told that the relevant Act imposes on the Minister the duty to lay before Parliament only those parts of a report which would not injure the public interest. He would be prepared to discuss the matter with industry if necessary.

Industrial Code

Brig. Prior-Palmer asked last week about the introduction of an industrial code in nationalised industries. The Minister of Labour declined to make a statement, saying that his proposals had been discussed at a meeting of the National Joint Advisory Council the previous day and were to be considered again at a later meeting.

Electricity in Scotland

Mr. J. Taylor asked two questions on Friday concerning electricity supplies in Scotland. In the first place he wanted to know details of any consultations which had taken place regarding the control of the supply industry in Scotland, and secondly what the Government proposed to do about generation, distribution and administration of supply in the country. The Secretary of State for Scotland said discussions were taking place with the Minister of Fuel and Power and representatives of Scottish Boards on technical matters, but no statement could be made yet.

Portobello Fault

In reply to a question from Mr. Wheatley, the Minister of Fuel and Power last week gave an account of the fault at Portobello power station on Friday, February 13, 1953. The report stated that at 6.33 p.m. there was an explosion in a piece of apparatus connected with a 132/33 kV transformer. He described the apparatus in question as "designed to guard against the dangers that arise from sudden increases in the flow of current."

The probable cause of the explosion he gave as excess moisture from the atmosphere getting into the apparatus. Gases produced by the explosion caused short circuits at the 132 kV terminals more than 20 ft above the apparatus. All the automatic gear operated, and the Portobello station together with the Edinburgh load was isolated from the Grid. At the time, Portobello was generating 107 MW, and Edinburgh was consuming 127 MW. To avoid damage from overload (a new 60 MW machine was running) most of the Edinburgh load was shed. At 8 p.m. it was possible to reconnect Edinburgh to the Grid by an alternative route, all consumers were reconnected, and by 8.40 p.m. the generator was brought back to full service.

Illegal Publication?

The Attorney-General's attention was drawn by Mr. G. Nabarro on Monday to the pamphlet entitled "The Place of Electricity in the Nation's Fuel and Power Policy." The publication, he said, purported to represent the views of the B.E.A., but carried no name of the issuing body or persons, the publishers or the printers. Could the identity of the responsible persons be established, he asked, and could it be discovered whether it was published with or without the B.E.A.'s authority. Sir Lionel Heald said inquiries were being made.

Electric Supply News . . .

Cumberland

The County Council has approved plans by the North Western Electricity Board for the construction of 11 kV lines at Tempest Towers, Little Orton, Corn Hill, Belle Vue, Hoskett Hill, East Curthwaite and Cumdivock.

Hexham

A deviation in the proposed route of the 275 kV grid line from Stella to Carlisle, suggested by the National Farmers' Union at a recent public meeting, has been accepted by the B.E.A. Last Friday, Mr. M. Speir, M.P. for Hexham, who convened the meeting, said that he had been informed that after discussions between amenity societies and the Northumberland Planning Committee, the adoption of the alternative route put forward by the farmers had been recommended. The amended route for the grid line's 110-ft pylons was suggested by the farmers so that it would not destroy the beauty of the Roman Wall country, and would avoid valuable arable land and villages. Apparently the pylons will not now be silhouetted against the skyline and the line will cross rough pasture land.

St. Germans (Cornwall)

The question of whether a supply to the Insworke housing estate, Millbrook, should be by o.h. line or underground cable is under consideration by the Rural Council. The latter was originally adament that the cable should be underground, but the South Western Electricity Board has pointed out that in such circumstances they would require a capital contribution of £1,490. Mr. L. Locker, district manager to the Board, and Mr. M. Sherwin, consultative council secretary, have now had discussions with the Housing Committee, in which it was pointed out that on the Millbrook site the revenue from the 54 houses was insufficient to cover the amortisation charges of underground cables, and the revenue would still be insufficient if the supply were to include a further 26 houses. The Committee has yet to make its decision.

South Wales

Construction of a power station at Machen would be a tragedy, and would have a disastrous effect on the beauties of the surrounding countryside. This view was expressed by Dr. T. Alwyn Lloyd, chairman of the Council for the Preservation of Rural Wales, at the public inquiry at Newport last week into the British Electricity Authority's £8,000,000 project for the district. It is proposed to acquire a 138-acre site for the construction of a generating station. Mr. James Kegie, Monmouthshire county planning officer, maintained that if the Authority went ahead immediately with the second station being planned at Uskmouth (Newport) there would be no need for the Machen scheme. The area for which the new station was suggested was south of the West Monmouthshire coalfield and was reserved by the county planning authority, with the approval of the Ministry of Agriculture, as an agricultural area. That was why the Ministry took such strong objection to the Machen plan in the first instance.

For the B.E.A. it was stressed that, to meet the increasing consumption in South Wales, it was necessary to construct, by 1960, one or two generating stations, in addition to those at Uskmouth and Burry Port. The proposed Machen station would have two boiler units, two cooling towers, an area for ash disposal and two 350-ft high chimneys. Mr. Donald Clark, the Authority's station development engineer, was asked why the Authority could not go on with the proposed second station at Uskmouth in place of the Machen scheme. He replied that the Authority wished to avoid "undue concentration," and the Uskmouth "B" scheme would cost £30,000 a year more than the Machen scheme. The inquiry was closed, and the decision of the Minister of Fuel and Power will be given later.

Whitehaven

On the recommendation of the Town Council, the House Management Committee is to reconsider its proposals that tenants of council houses should bear the full cost of replacements to electric cookers. The cost of replacements has risen to about £2,800 per annum, covering about 1,000 houses. The Town Council has suggested that the terms should be modified to draw a distinction between replacements due to normal wear and tear and those due to carelessness and other reasons.

LIGHTING SCHEMES

Chatteris.—U.D.C. applying for consent to borrow £3,035 for the conversion of certain streets to Group "A" lighting.

Cheltenham.—T.C. recommended to approve a long-term scheme for the improvement and modernising of street lighting at an estimated cost of £30,000.

Epsom and Ewell.—The Highways Committee has estimated the cost of improving the lighting of parts of certain main roads at £26,900. These include London Road, South Street, Cheam Road, Kingston Road and Ewell High Street.

Hinckley.—The U.D.C.'s coming year's programme for the conversion of street lighting to electricity will cost £3,355, including £1,352 for 26 lamps in Shilton Road, Barwell.

Leatherhead.—U.D.C. is recommended to approve (*a*) a £20,000 scheme for sodium discharge lighting on the Epsom-Guildford Road and on the Kingston-Dorking Road, and (*b*) the conversion from gas to electricity of the lighting in all roads other than class A roads, at a cost of £18,000.

Company Activities . . .

Associated Electrical Industries

An increase of nearly £2 million in the trading profit is shown in the preliminary statement for 1952. The total is £9,904,000 compared with £7,924,000 for the previous year, and the final dividend of 12½% again makes 20%. As may be expected, taxation takes a larger share—£7,202,000 this time as against £5,400,000 previously, and the net profit available for distribution is £2,702,000 (*£2,524,000*).

Clarke, Chapman and Co.

An increase in the Ordinary dividend is announced. The rate is to be 17½% compared with 15% for each of the previous two years. The net profit, after all charges, including taxation and placing £50,000 to reserve for replacement of fixed assets, amounts to £216,791, some £34,246 higher than for 1951.

English Electric Co., Ltd.

The sound financial position of this concern is clearly indicated in the full accounts for the year ended December 27 last. The consolidated current assets total £58,718,610, an increase of £11,181,024. Stock and work in progress alone amount to £46,233,332, which is over £11 million higher than for the previous year, representing a substantial increase in the rate of activity in the normal business of the group and the incidence of other work under the defence programme.

Year to Dec.27	£ Trading Profit	£ Net Profit*	% on Ord.		Ord. Price	
			Earn'd	Paid	High	Low
1948	1,960,966	622,607	28	10	58/9	43/6
1949	2,661,134	819,194	38	10	49/6	40/9
1950	4,085,342	1,099,892	45	15	48/10	38/6
1951	4,762,088	1,300,475	56	15	74/3	47/3
1952	5,948,403	1,543,725	53	15	59/3	50/3

*Available for parent company.

Hoover Ltd.

Further evidence of the effects of the Australian Government's sudden curtailment last March of imports is reflected in the sharp fall in the profit made by this company for 1952. Compared with the 1951 record total of £3,014,894 the group profit for 1952 dropped to £1,602,721. The net profit is reduced to £648,897—just over half the previous year's figure. The dividend, too, is being reduced. There is to be a final of 9d. per 5s. unit (*against 1s. 3d.*), making a total of 1s. 3d. (*1s. 9d.*).

International Combustion (Holdings).

The final dividend of 10% on the increased capital, with the 10% interim on smaller capital, makes the total equivalent to 30% on the old capital on which 25% was paid last year. For the year ended September 30 last, the group profit, after providing for all charges including taxation, is £464,642 compared with £545,189.

Westinghouse Brake & Signal Co.

Treasury consent has been obtained to the issue to which we referred last week. Some 673,423 new £1 Ordinary shares are offered at 45/- each on the basis of three for five held.

Dividends Declared

Heenan and Froude.—Interim of 5% (7½% *which included a special bonus of 2½%*).

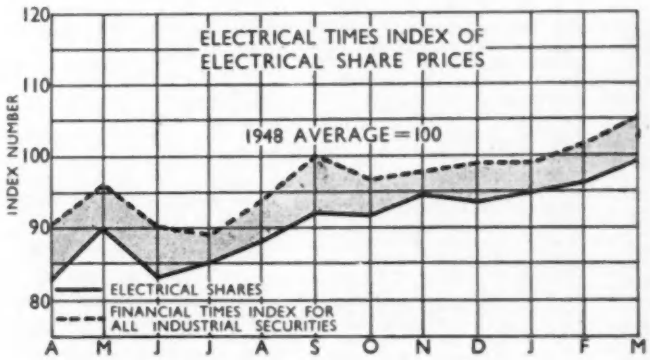
General Electric Co. Ltd.—Interim Ordinary dividend of 3¾% on doubled capital (7½% *on smaller capital*).

Singapore Traction.—Ordinary dividend of 10% —the first for ten years.

Thomas Bolton and Sons.—Final Ordinary dividend of 7½% plus cash bonus 2½%.

Midland Electric Manufacturing Co.—Dividend of 15% (*same*). Net profit, £155,811 (*£138,611*).

Bruce Peebles and Co.—Ordinary dividend is again 15%. The profit, after taxation, is £105,035 (*£123,922*).



Steady rise in both share price indices over the last few months continued during February and that for electrical shares is now not far short of the 1948 average. It had risen by the end of the month to 98·4, an increase of 2·3, whilst the "Financial Times" industrial share price index rose by 2·1 to 105·3. Figures are based on average index of 100 for 1948

Commercial Information

CONTRACTS OPEN

HOME

Mar. 6.—Southport T.C. Floodlighting of jumping ring at Flower Show on Mar. 26, 27 and 28. Details from Secretary, Southport Flower Show, Victoria Buildings, Lord Street. (See Feb. 19 issue.)

Mar. 7.—Bath. Supply of electric lamps and control gear, time switches and other equipment for street lighting. City Engineer, Guildhall.

Mar. 7.—Llanelly. Installation of stage lighting equipment, emergency lighting cables, switches, etc., at Pontyberen Memorial Hall and Institute. Applications by above date to G. Bowen, Secretary of Institute, Llanelly.

Mar. 7.—Longbenton U.D.C. Installation of electricity in 20 houses at Forest Hall and 32 at Wideopen. A. S. Sweetman, surveyor, Council Offices, Forest Hall, Newcastle. Deposit £2 2s.

Mar. 7.—Merthyr Tydfil T.C. Certain electrical goods required during year beginning April 1. Borough Engineer and Surveyor, Town Hall.

Mar. 7.—Wexford. Supply and erection of fully equipped electrically driven centrifugal pumping plant and water treatment plant at Taghmon. T. J. O'Connor, consulting engineer, Commercial Bldgs., Dame St., Dublin. Deposit £5 5s.

Mar. 9.—Armagh. Electrical installation at Newtownhamilton intermediate and primary schools. J. R. W. Murland, consulting engineer, 13 Wellington Place, Belfast. Deposit £5 5s.

Mar. 9.—Eton R.D.C. Manufacture and installation of seven sets of electrically driven vertical unchokable sewage pumps with ancillary equipment, for three stations in Denham drainage scheme. Consulting Engineers, John Taylor and Sons, Artillery House, Artillery Row, Westminster. Deposit £5.

Mar. 9.—Luton T.C. Installation of coronation decorative lighting in parts of town. Borough Engineer, Town Hall. Deposit £2 2s.

Mar. 9.—West Riding Electrical installation at Treeton school. County Architect, "Bishopgarth," Westfield Rd., Wakefield.

Mar. 10.—Peterhead T.C. Electrical work in erection of six blocks of dwellings on Blackhouse site. R. D. Cruickshank, borough architect, 60 Broad St.

Mar. 10.—Thurles U.D.C. Supply and installation of duplicate electrically driven pumping plan at Lady's Well. Nicholas O'Dwyer, Consulting Engineer, 6 Burlington Rd., Dublin. Deposit £5 5s.

Mar. 11.—Newcastle-on-Tyne. Repair and maintenance of electric lighting installations on various housing estates during April to Sept. inclusive. City Architect, 18 Cloth Market.

March 11.—Pudsey (Yorks) T.C. Electrical work in extensions of Albert Hall—tenderers must be members of E.C.A. or on National Register. Borough Surveyor, Town Hall. Deposit £5 5s.

Mar. 12.—Londonderry T.C. Electrical installation in Crawford St. flats. Housing Architect, 5 Guildhall St. Deposit £3.

Mar. 13.—Durham. Electrification of 320 council houses hitherto lit by gas. City Engineer, Town Hall. Deposit £2 2s. (See Feb. 26 issue.)

Mar. 14.—Evesham T.C. Supply and installation of 24 140 W sodium lighting units with auxiliary equipment and tubular steel columns on Avonside-Waterside (A.44) road. Borough Surveyor, 1 Leicester Gables, High St. Deposit £2 2s.

Mar. 14.—Evesham T.C. Supply and installation of 24 140 W sodium lighting units, with auxiliary equipment and steel columns at Avonside-Waterside, A.44. Borough Surveyor, 1 Leicester Gables, High St. Deposit £2 2s. (See Feb. 26 issue.)

Mar. 14.—Frimley and Camberley U.D.C. Installation of electric light in 132 houses in district. Engineer and Surveyor Municipal Buildings, Camberley. (See Feb. 12 issue.)

Mar. 14.—King's Lynn T.C. Supply of electric lamps required during year beginning April 1. Borough Engineer, H. G. Ridler, Clifton House, 17 Queen Street.

Mar. 17.—Londonderry. Electrical installations in 24 flats at Creggan. N. Ireland Housing Trust, 12 Hope St., Belfast. Deposit 10s.

Mar. 17.—Mansfield T.C. Provision and erection of either 160 or 200 concrete street lighting columns with 500 W tungsten lamps, lanterns, wiring, etc. Borough Engineer and Surveyor, Carr Bank. Deposit £2 2s.

Mar. 18.—Galway. Electrical installation at fire station at Carryglass. J. C. Costello, consulting engineer, 21 Leeson Park, Dublin. Deposit £5 5s.

Mar. 19.—Co. Down. Complete electrical installation at Dundonald primary school extension. Architects are Munce and Kennedy, 133 University St., Belfast. Deposit £3 3s.

Mar. 20.—Hemel Hempstead T.C. Supply of electric lamps required during fiscal year 1953-54. A. H. Turner, Borough Engineer, Market Square.

Mar. 20.—Huddersfield T.C. Electrical work in filter house to be constructed at Holmbridge. Documents from Waterworks Engineer, 24 Ramsden St. Deposit £1 1s.

Mar. 21.—Staffordshire. Electrical repairs and installation work in schools at Bilston, Darlaston, Wednesbury, Wednesfield and Willenhall (state district(s)). Div. Education Officer, Walsall St., Wednesbury.

Mar. 23.—Brownhills U.D.C. Supply and erection of about 68 mercury lamps on steel and concrete columns and brackets (class A) along A452, London-Holyhead Rd. Engineer and Surveyor, Coombe House. Deposit £2 2s.

Mar. 23.—Willesden T.C. Contractors wishing to be included on council list for installation of electric lighting and power work should apply by above date to J. C. Morris, Borough Engineer and Surveyor, Town Hall, Dyne Rd., Kilburn, N.W.6.

Mar. 24.—Barnsley T.C. Supply of tower wagon and 10-cwt. van with ladder fittings. A. E. Gilfillan, Town Clerk, Town Hall. (Advertised in this issue.)

Mar. 24.—Ilford T.C. (*a*) supply of 158 140 W sodium lanterns, lamps, jackets and control gear, and (*b*) supply, erection, etc., of 158 concrete columns and installation of lanterns, etc. Borough Engineer and Surveyor, Town Hall. Deposit £2 2s. for each contract. (See Feb. 12 issue.)

Mar. 24.—Manchester. Electrical installation in shops, maisonettes etc. at Brooklands Main Centre, Wythenshawe. City Architect, Town Hall. Deposit £1 1s. (Advertised in this issue,)

Mar. 25.—Newcastle-on-Tyne. Electrical installation in (a) 42 flats in Armstrong Rd., (b) 48 flats on Fairways estate, and (c) 60 flats on Longbenton estate. City Architect, 18 Cloth Market.

Mar. 28.—Cork. Supply of electrically operated tidal penstock for sewerage scheme at Glanmire. E. Callanan, county secretary, Council's Offices, 7 Fr. Mathew Quay, Cork. Deposit £5.

April 8.—Newcastle-on-Tyne. Electrical installation in 84 flats on Montagu estate and 72 flats on Blakelaw estate. City Architect, 18 Cloth Market.

April 10.—Belfast. Supply and erection of drainage pumping equipment incudilng 600 g.p.m. pumps, motors, pipes, valves, lighting tackle, etc., for Victoria power station. Merz and McLellan, consulting engineers, Carliol House, Newcastle-on-Tyne. Deposit £5 5s. (See Feb. 26 issue.)

April 14.—Islington B.C. Installation of fluorescent lighting, wiring, etc., in Essex Rd. library. Borough Engineer and Surveyor, Town Hall, Upper St., N.1. (Advertised in this issue.)

No date stated.—Dalkeith. Electrical work in conversion of police barracks to sub-divisional headquarters. County Architect of Midlothian, 32 Palmerston Place, Edinburgh.

No date stated. — Haddington T.C. Electrical installation in 39 houses on Rooulands site. John A. W. Grant, chart. arch., 36 Melville St., Edinburgh.

No date stated.—Melrose T.C. Electrical installation in development of corner of Abbey St. comprising a shop and 18 houses. Apply to F. P. Smart, Town Clerk, Melrose.

No date stated.—N. of Scotland H.E. Board. Lighting and heating installation at Linchart power station, Ross-shire. Merz and McLellan, consulting engineers, 39 Northumberland St., Edinburgh. Deposit £2 2s.

OVERSEAS

*Details of items marked * may be obtained on application to the Board of Trade, Horseguards Avenue, S.W.1, quoting reference.*

Mar. 18.—Uruguay. Supply of armoured cable for underground installation and accessories for Usinas Electricas y Telefonos del Estado, Paraguay 2431, Montevideo. B.o.T. (Ref: CRE 6728/53).*

Mar. 25.—Uruguay. Supply of about 3,100 fluorescent lamps, between 15 W and 40 W, wanted by State Railways Administration to work on a.c. mains, 220 V, 50 c/s. B.o.T. (Ref: CRE 4453/53).*

Mar. 27.—Uruguay. Usinas Electricas y los Telefonos del Estado, require supply of 11 outdoor and one indoor transformers with spares equipment. U.T.E. is at Paraguay 2431, 8 piso, Montevideo. B.o.T. (Ref. CRE 6744/53).*

April 8.—New Zealand. Supply of 1,500 two-conductor switchboard cords to various specifications for Post and Telegraph, G.P.O., Wellington. B.o.T. (Ref. CRE 6371/53).*

April 8.—New Zealand. Supply of 500 condensers, paper, tubular, miniature, metal cased, nom. cap. 0.1. mfd, 500 V, not greater than 2⅛ in. by ¼ in. Director-General (Stores Div.), G.P.O., Wellington.

April 8.—New Zealand. Supply of 54 rotary convertors for stand-by power supply for State Hydro-Electric Dept., P.O. Box 8025, Wellington. Documents from N.Z. Govt. Offices, 415 Strand, London, W.C.2.

April 17.—Uruguay. Supply of 30 contact breakers for 300A, 30 for 400A, and 20 for 200A, for connecting and disconnecting 3-phase ciruit once every 24 hrs. Usinas Electricas y Telefonos del Estado, Montevideo. B.o.T. (Ref.: CRE 7529/53.)*

May 7.—Australia. Manufacture and supply of two groups of 35 sets of equipment, each set to form a unit type substation for outdoor service. Thirty other sets of equipment also required but providing for balanced voltage protection of feeders. Sydney County Council, Queen Victoria Building, George St. B.o.T. (Ref: CRE 7249/53).*

May 19.—Australia. Supply of pumping machinery, including electric motors, flow recorders, switchboards, control gear, travelling cranes, spares, etc.—for Cundardin and Kellerberrin stations on Goldfields water supply main. Public Works Dept., St. George's Terrace, Perth. B.o.T. (Ref.: CRE 6939/53).*

Your Queries — Answered

"Dimma" dimmer switches, makers of? W.P.—Electrothermal Eng. Co. Ltd., 270 Neville Rd., London E.7. (25129)

"Selecta" drills, makers of? H.H.—B. Elliott and Co. Ltd., Victoria Works, Victoria Road, N.W.10. (25135)

Thomas B Thrige—Odense—Denmark, agents for? T.M.—T.B.T. Electric Co. Ltd., 15 New Bridge St., E.C.4. (25142)

"Lutrev" mixers, suppliers of? M.A.—Kerrys (Gt. Britain) Ltd., Warton Rd., High Street, E.15. (25148)

"Walkerlite" table lamps, makers of? T.E.—Walker Fender Co. Ltd., Sherborne St., Ladywood, Birmingham 16. (25156)

"Synchronomains" clocks, makers of? L.E.—Synchronome Co. Ltd., Abbey Electric Clock Works, Woodside Place, Alperton, Middx. (25164)

Photo-electric clock, depicted on page 412, last week, makers of? H.D.—Patek Philippe and Co., S.A., Geneva, Switzerland. (25171)

The above are selected from questions we have answered this week. If you have a query, send it to us.

ANSWER WANTED

B.C. lampholder, marked Made in England, made of a zinc base alloy and aluminium, makers of? W.B. (25179)

"Culvert" plug in underground busbar system, makers of ? H.T. (25186)

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 113 Chancery Lane, London W.C.2.

A. and R. Electric Co. Ltd., Walton Bridge Rd., Shepperton, Middlesex. Manufacturers of and dealers in wireless and television sets, etc. Cap.: £100. Dirs.: H. M. Roussel and Beryl C. Roussel.

G. S. Akinhead and Co. Ltd., 465 Chillingham Rd., Newcastle-on-Tyne. Heating engineers and contractors, etc. Cap.: £10,000. Dirs.: G. S. Akinhead and Mrs. C. Akinhead.

Barker and Millard Ltd., 16 Clayton Rd., Lidget Green, Bradford. Television and wireless electricians, electrical and mechanical engineers, etc. Cap.: £2,000. Dirs.: A. Barker and D. Millard.

Belsize Village Electrical Ltd. Electricians, radio and mechanical engineers, etc. Cap.: £1,000. Dirs.: G. L. Lawrence, 26, South Hill Park, N.W.3.

Canterbury Electric Welding Co. Ltd. Cap.: £2,000. Dirs.: F. T. J. Hunt and Mrs. I. Hunt, 2 Hollow Mead, Hollow Lane, Canterbury; G. W. M. Finn and Mrs. J. I. Finn, Ridlings, Stelling Minnis, Canterbury.

Contractors and Industrial Equipment Ltd. Mechanical and constructional engineers, electrical, building and civil engineers, etc. Cap.: £5,000. Dirs.: W. E. Budden, 161 Holly Road, Birmingham 20; and W. J. Odell, Park Cottage, Braughing nr. Ware, Herts.

G. P. Cree Ltd. To take over business of electrical engineers and contractors carried on at 1 St. Stephen's St., Tonbridge, by Geo. P. Cree. Cap.: £1,000. Dirs.: G. P. Cree and H. G. Dehn.

A. S. Dickins Ltd., Scotson Chambers, High St. South, Dunstable, Beds. To buy, sell, manufacture, factor and deal in cleansing materials, etc., and generally to deal in equipment used for laboratory, surgical, hospital, photographic, scientific or electrical purposes, etc. Cap.: £1,000. Dirs.: A. S. Dickins and Capt. W. H. Dickins.

Electronic Gauges Ltd., Deason House, 23 Henry St., Keighley. Electronic designers and manufacturers, etc. Cap.: £100. Dirs.: J. B. Andrews, J. E. Hill, P. Buisson, Ivy Lawrence and M. Suire.

PRICES OF CABLE METALS AND OTHER MATERIALS
(at Tuesday night)

	£ s. d.	New York price
COPPER, electrolytic	285 0 0	—
LEAD, good soft pig (foreign)	89½-89¼	108 0 0
" " "English" quality	90⅞-91	
Tin (99—99.76%) ...(Cash)	959-960	—
" (3 months)	941-943	—
ALUMINIUM, commercial purity (del.)	166 0 0	—
ZINC	78⅛-78⅜	90 0 0
ARMOURING:		
Galv. Steel Wire (0·104 in.)	51 10 0	—
Mild Steel Tape (0·04 in.)	39 15 0	—

CONTRACTS PLACED

B.E.A. Two 60,000 kW turbo-generators, condensing and feed heating plant at Tilbury, C. A. Parsons and Co., Ltd.; high-pressure steam and feed piping at Drakelow, Aiton and Co., Ltd.; 132 kV transformers at Meaford, British Thomson-Houston Co., Ltd.; 11·8 kV and l.v. cables and connections at Connah's Quay, British Insulated Callender's Construction Co., Ltd.; low-pressure valves at Stella North, J. Blakeborough and Sons, Ltd., and 3,300V and 415V switchgear and accessories at same, A. Reyrolle and Co., Ltd.; five 1,280 kW diesel alternator sets at Blackpool, Harland and Wolff, Ltd.; high-pressure pipework and valves at Carrington, Stewarts and Lloyds, Ltd.; high-pressure and low-pressure pipework equipment at Chadderton, Stewarts and Lloyds, Ltd.; two 37·5 MVA generator transformers at Hartshead, English Electric Co., Ltd.; two 2,000 kW diesel alternator sets at Kendal, Mirrlees, Bickerton and Day, Ltd.; 66 kV, 2,500 MVA switchgear at Lodge Road substation and St. Marylebone power station, British Thomson-Houston Co., Ltd.; 132 kV, 3,500 MVA switchgear at Marchwood, British Thomson-Houston Co., Ltd.; 132 kV, 2,500 MVA switchgear at Bournville, A. Reyrolle and Co., Ltd.; 132 kV, 1,500 MVA switchgear at Ystradgynlais, Metropolitan-Vickers Electrical Co., Ltd.; 60 MVA, 132/33 kV transformers and earthing transformers at Corby, British Electric Transformer Co., Ltd.; 132 kV overhead lines between Skelton Grange and Rodley, Pirelli-General Cable Works, Ltd.; 132 kV overhead line from Sowerby Bridge and Thornhill, Riley and Neate, Ltd., and 132 kV, 3,500 MVA switchgear at Clyde's Mill, Metropolitan-Vickers Electrical Co., Ltd.

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

Camley Engineering Co., Ltd. Meetings of members and creditors to be held at Poppleton and Appleby, 93 Queen St., Sheffield, on Mar. 10, at 2.30 p.m. and 2.45 p.m. resp.

Electricity House Ltd. Meeting of members is to be held at Scarcroft Lodge, Wetherby Rd., Scarcroft, nr. Leeds, on Mar. 27 at 2.30 p.m. to receive liquidator's report.

W. Ratcliffe and Co., Ltd. The liquidator, Arthur Tyldesley Eaves of 47 Mosley St., Manchester, released as from Feb. 9.

Stamford Electrical Ltd. First and final dividends of 2s. 10·6d. in £ payable on Feb. 27 (or any subsequent day except Sat.) at Official Receiver's Office, Inveresk House, Strand, W.C.2.

Webcot Ltd. Resolution for winding-up passed at meeting on Feb. 16. P. J. Snow, 17 Albion St., Hanley, Stoke, was appointed liquidator, to whom creditors are asked to send particulars by Mar. 25.

BANKRUPTCY ACTS

Intended Dividend

Kendal. Stephen Edmondson, electrical dealer and contractor trading as E. and B. Radio at Main St., Milnthorpe. First and final dividends of 3s. 9d. in £ payable today, Mar. 5, at 31 Lloyd St., Manchester.

Order on Application for Discharge

Leeds. Ronald S. Lees, trading as electrical factor, R. S. Lees and Co. of 21 Gledhow Park Rd., Leeds. Date of order, Jan. 28. Bankrupt's discharge suspended for six months and that he be discharged from July 28.

Liverpool. Ernest Whitehouse, electrical and radio engineer, of 29 Westfield St., St. Helens. Bankrupt's discharge suspended for a month and that he be discharged from July 13, 1952.

BUSINESS PROSPECTS

HOME

Belfast. Layout plans approved for erection of about 300 houses in Springfield Road.

Blackburn T.C. Application to be made to borrow £44,000 for erection of Shadsworth primary school.

Bletchley (Bucks) U.D.C. Erection of factory in Denbigh Rd.

Brighton T.C. Six shops with 15 flats are to be built in St. George's Rd. Town Clerk.

Also erection of 29 houses and 60 flats on Denton Drive site. Town Clerk.

Crewe. Work is to start in the spring on British Railways' apprentices' training school.

Cambridge. A £100,000 telephone exchange is to be built in Trumpington Road.

Cardigan. One hundred houses to be built at Greenland Meadows.

Chesterton (Camb.) R.D.C. Construction of 76 dwellings at Great Shellford. H. Jackson, architect, 93 Hartington Grove, Cambridge.

Coulsdon and Purley U.D.C. Land is to be acquired in Old Lodge Lane for construction of over 300 houses, row of shops, a church, public house, and eventually, a school and other buildings.

Cumberland. A £42,650 scheme for new fire station at Hensingham has been approved.

Dagenham T.C. Construction of 5 shops and 10 flats, and 12 flats in Whalebone Lane. Borough Engineer and Surveyor, Civic Centre.

Denbighshire. Next year's school building programme is to include Wrexham Technical College, Hafod-y-Wern primary school, Abergele primary school, and four other schools.

Dorking U.D.C. It is proposed to build a total of over 500 dwellings at Goodwyns Place. Tenders will probably be invited early next month.

Dumfries. Eighty houses to be built on five sites.

Durham R.D.C. Layout plans approved for 176 houses at N. Bowburn.

Esher U.D.C. Erection of 30 houses on Faraday Rd. estate, E. Molesey. Engineer and Surveyor, Council Offices.

Gateshead. North Eastern Trading Estates, Ltd., are to build a 30,000 sq. ft. factory on Team Valley estate, Kingsway.

Gosport T.C. It is proposed to build 134 houses near Rowner estate and four blocks of maisonettes in South Street.

Hartlepool T.C. Estimates include £900 for re-wiring Borough Hall, and £10,270 for street lighting along seven roads.

Heston and Isleworth T.C. Construction of 36 flats in Field Lane and 23 houses in Woodfield Rd. Borough Engineer and Surveyor, O. P. F. Hilton, 88 Lampton Rd., Hounslow.

Huddersfield. Erection of Lindley Voluntary C.E. School. Architect, S. M. Richmond, High St. Buildings, Huddersfield.

Ilkeston T.C. Erection of 60 houses on Kirk Hallam estate. A. O. Marshall, Borough Engineer and Surveyor, Town Hall.

Irvine T.C. Dean of Guild Court has approved erection of 92 houses.

Kirkcaldy T.C. Approval given to erection of 500 houses in Templehall area.

Lisburn R.D.C. Construction of 98 houses in Moss Rd., Lambeg. Architect, W. B. Maxwell, 5 University Terrace, Belfast.

Litherland U.D.C. Permission to borrow £194,500 being sought for erection of 96 flats on Linacre Rd. site.

Luton T.C. Erection of 150 houses on Runfold Ave. estate, Borough Engineer, Town Hall.

Newcastle-on-Tyne. C. Solomon, St. Mary's Place, is architect for factory in Blenheim St. for Shaw Processes, Ltd.

Newport (Mon.) T.C. Tenders may be invited soon for erection of 113 houses on St. Julians (North) estate.

Northfleet (Kent) U.D.C. Erection of 70 houses on New House Farm estate. Engineer and Surveyor, Council Offices.

Ruislip-Northwood U.D.C. Erection of 26 houses and 40 maisonettes at Whitby Rd. Engineer and Surveyor, Council Offices, Oaklands Gate, Northwood.

Poole T.C. Erection of 68 houses at Wallsdown. Borough Engineer, Municipal Buildings.

Portsmouth T.C. Construction of 80 flats at Wymering. A. E. Cogswell and Sons, Prudential Buildings, Commercial Road.

OVERSEAS

Dominica. Contact with U.K. makers of electric motors and generators sought by Stres. Terc, C. por A., Avenida Mella 63 Cindad Truiillo, (P.O. Box 13).

U.S.A. U.K. source of supply sought of circuit-breakers, transformer terminal boxes and liquid for internal transformer insulation, by Electrical Service Co., Ardis Heights, Greenville, Texas.

TRADE NOTES

New Branch. Smart and Brown (Engineers), Ltd., have vacated their Leeds address at 5 Queen's Court, 169 Lower Briggate, and are now at 15 St. Ann St., Leeds 2. Telephone: Leeds 21113.

Changes of Address. The showrooms and offices of Blick Time Recorders, Ltd., are now at 96-100 Aldersgate St., E.C.1. Telephone: Monarch 6256.

The registered office of Lancashire Dynamo Holdings, Ltd., has now been moved to St. Stephen's House, Victoria Embankment, London, S.W.1. Telephone: Whitehall 7211. At this new address, also, are located: The registered office, London sales office and Export Department of Lancashire Dynamo and Crypto Ltd. Telephone: Whitehall 7211; the Export and London and Home Counties sales offices of Lancashire Dynamo Switchgear, Ltd., and Crypton Equipment, Ltd., and the office of Lancashire Dynamo Group Publicity Services. Telephone: Whitehall 2751.

The address of the Glass Manufacturers' Federation; the British Lampblown Scientific Glassware Manufacturers' Association, Ltd.; British Chemical Ware Manufacturers' Association, Ltd.; Lighting Glass Manufacturers' Association, and European Glass Manufacturers' Federation is now 19 Portland Place, W.1. Telephone : Langham 6952.

New Co. E. K. Cole, Ltd., have registered Ekco Electronics, Ltd. This wholly-owned subsidiary will be responsible for the marketing of the electronic equipment which has been an expanding asset of the E. K. Cole, Ltd., activities.

MEETINGS TO NOTE

THURSDAY, MAR. 5

A.S.E.E. (S. London Branch).—"Electrical Installations." W. F. Parker. Cafe Royal, Croydon, 8 p.m.

I.E.E. (London).—"Design Features of Certain British Power Stations." S. D. Whetman and A. E. Powell, Savoy Place, W.C.2, 5.30 p.m.

I.E.S. (Glasgow Centre).—Annual dinner and social.

I.E.S. (Nottingham Centre).—"Lighting of Power Stations." L. H. Hubble. Elect. Offices, Smithy Row, 6 p.m.

I.E.S. (Exeter Group).—"Outdoor Illumination." H. A. Turner, The Providence Hall, Northernhay St., 7 p.m.

BRITISH INSTN. OF RADIO ENGRS. (Scottish Section).—"Electronics in Nuclear Research." J. M. Reid. Glasgow University.

INCORP. PLANT ENGRS. (Peterborough).—"Modern Refrigeration." Gas Offices, Church St., 7.30 p.m.

INST. OF WELDING (N.E. Branch). "Hard Surfacing of Steel by Electric Welding." W. D. Biggs.

FRIDAY, MAR. 6

A.S.E.E. (Liverpool Branch).—"Effect of Electric Shock on Humans." D. A. Picken. Engineering Soc., 9 The Temple, Dale St., 7.30 p.m.

I.E.E. (E. Midland Centre).—Annual dinner at Victoria Station Hotel, Nottingham, 6.45 p.m.

I.E.E. (Scottish Centre).—Annual dinner at Grand Hotel, Edinburgh.

I.E.E. (N. Staffs sub-centre).—"Logical Approach to Problems of Electric Space-Warming." D. H. Parry. Elect. Showroom, Stoke, 7 p.m.

I.E.S. (Bath and Bristol Centre).—"Outdoor Illumination." H. A. Turner. Elect. Board, Colston Ave., Bristol, 6.15 p.m.

BIRMINGHAM ELECTRIC CLUB.—Annual dinner.

MONDAY, MAR. 9

A.S.E.E. (N.W. London Branch).—"Motor Control Gear." R. F. Mathieson. Prince of Wales Hotel. Kingsbury, N.W.9, 8 p.m.

I.E.E. (N.E. Centre).—"Performance of Natural Draught Water-Cooling Towers." H. Chilton. Neville Hall, Westgate Rd., Newcastle, 6.15 p.m.

I.E.E. (Western Centre).—"275kV Developments on British Grid System." D. P. Sayers, J. S. Forrest and F. J. Lane. Inst. of Engrs., Park Place, Cardiff, 6 p.m.

I.E.E. (London).—Discussion on "Is Presentation of Technical Literature Adequate?" Prof. M. G. Say. Savoy Place, W.C.2, 5.30 p.m.

I.E.S. (Sheffield Centre).—"Road Vehicle Lighting." J. Nelson. University Western Bank, 6.30 p.m.

LEICESTER ELECTRICAL SOC.—"Problems of Breaking Capacity as it affects Works Engineers." D. H. Leeson. Elect. Offices, Charles St., 7 p.m.

TUESDAY, MAR. 10

A.S.E.E. (Bolton Branch).—"Light and Vision." A. Wilcock. Balmoral Hotel, Bradshawgate, 7.30 p.m.

I.E.E. (E. Midland Centre).—"Electricity in Farm Crop-Drying." C. A. Cameron Brown and P. G. Finn-Kelcey. Elect. Service Centre, Derby, 6.30 p.m.

I.E.E. (N.W. Centre).—Annual dinner at Midland Hotel, Manchester, 6.45 p.m.

I.E.E. (N. Ireland Centre).—"Protection of Electrical Power Systems." H. Leyburn and C. H. W. Lackey. Presbyterian Hostel, Howard St., Belfast, 6.15 p.m.

I.E.S. (London).—Discussion on "Post-War Building Studies No. 30—Lighting of Office Buildings." Royal Soc. of Arts, W.C.2, 6 p.m.

NEWPORT ELECTRIC CLUB.—"Fractional Horse Power Motors.." J. V. Woods. Tredegar Arms Hotel, 7 p.m.

BRITISH INSTN. OF RADIO ENGRS. (London).—Discussion on "Classification of Electronic Circuits and Standardisation of Symbols." L. H. Bainbridge-Bell. School of Hygiene, Keppel St., W.C.1, 6.30 p.m.

WEDNESDAY, MAR. 11

A.S.E.E. (Bradford Branch).—"Lift Control Gear." Mr. Greenwood. Midland Hotel, 7.30 p.m.

I.E.E. (N. Midland Centre and Sheffield sub-centre).—"Electricity Supply—Statistical Approach to some Problems." R. B. Rowson. Stafford Arms Hotel, Wakefield, 7 p.m.

I.E.E. (N. Lancs sub-centre).—"Characteristics and Control of Rectifier Motor Variable-Speed Drives." N.W.E.B., North Rd., Lancaster.

I.E.E. (N. Scotland sub-centre).—"Design of High-Speed Salient-Pole a.c. Generators for Water-Power Plants." E. M. Johnson and C. P. Holder. Caledonian Hotel, Aberdeen, 7.30 p.m.

I.E.E. (Southern Centre).—"Electricity in Farm Crop-Drying." C. R. Cameron Brown and P. G. Finn-Kelcey. Elect. Board's Offices, Hove, 6.30 p.m.

I.E.E. (London Radio Section).—"Low-level Modulation Vision Transmitters—Kirk O'Shotts and Wenvoe Stations." E. McP. Leyton, E. A. Nind, and W. S. Percival. Savoy Place, W.C.2, 5.30 p.m.

I.E.S. (Huddersfield Group).—"Light and other Radiations in Crime Investigation." C. H. Edlin. Elect. Showroom, Market St., Huddersfield, 7.15 p.m.

BRITISH INSTN. OF RADIO ENGRS. (N.E. Section).—"Slotted Aerial Design." Neville Hall, Westgate Rd., Newcastle, 6 p.m.

THURSDAY, MAR. 12

I.E.E. (E. Midland Centre).—"Earthing." P. W. Cave. Corn Exchange, Spalding, 7.30 p.m.

I.E.E. (N. Scotland sub-centre).—"Design of High-Speed Salient-Pole a.c. Generators for Water-Power Plants." E. M. Johnson and C. P. Holder. Royal Hotel, Dundee, 7 p.m.

I.E.E. (S.W. sub-centre).—"Determination of Time and "Frequency." Humphry M. Smith. Grand Hotel, Plymouth, 3 p.m.

I.E.E. (Swansea sub-centre).—"Domestic Electrical Installations: Some Safety Aspects." H. W. Swann. Central Public Library, 6 p.m.

I.E.S. (Birmingham Centre).—Annual meeting at Regent House, St. Philip's Place, Colmore Row.

I.E.S. (Manchester Centre).—"Transport Lighting." E. G. Wotton Elect. Offices, Town Hall Extension, 6 p.m.

E.P.E.A. (Mersey Tech. Group).—"Modern Boiler Plant." W. F. Simonson. Elect. Showroom, Whitechapel, Liverpool, 7 p.m.

FRIDAY, MAR. 13

A.S.E.E. (Crewe Branch).—"Modern Domestic Electrical Installations." R. Q. Nicholls. Royal Hotel, Nantwich Rd., 7.30 p.m.

E.P.E.A. (Southern Meter Engrs. Group).—Brains Trust at Caxton Hall, Westminster, 6.30 p.m.

I.E.E. (Mersey and N. Wales Centre).—Annual dinner-dance.

I.E.S. (Nottingham Centre).—Annual Ladies evening at Victoria Station Hotel.

JNR. INSTN. OF ENGINEERS.—"Electronic Components—Elements of an Industry." J. D. Hinchcliffe. Townsend House., Greycoat Place, S.W.1, 7 p.m.

INSTN. OF WELDING (E. Midlands).—"Developments in Welding Research." H. G. Taylor. Tech. College, Lincoln, 7.15 p.m.

INSTN. OF HEATING AND VENTILATING ENGRS. (Manchester).—"Panel Heating." L. J. Fisher. Engrs. Club, Albert Sq., 6.30 p.m.

EXHIBITION DIARY

Daily Mail Ideal Home. Opened on Mar. 3 at Olympia, London, and continues until Mar. 28.

Factory Equipment. Opens on Mar. 23 at Royal Horticultural Society's New Hall, Westminster. Closes on Mar. 27.

Electrical Engineers' Second National Exhibition will open at Earls Court on Mar. 25, continuing until Mar. 28.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Cerene. 713,015. Class 11. Carbons for electrical purposes. Charles H. Champion and Co. Ltd., National House, 60/66 Wardour St., W.1.

Chickchilla. 713,790. Class 11. Installations for refrigeration. D. P. Toomey and Co. Ltd., 67 Preston St., Brighton.

Comet. 714,159. Class 11. Heaters for use with aquariums. James North (London) Ltd., 316 Lee High Road, S.E.13.

Contactrode. 713,608. Class 9. Electrodes for electric welding. Philips Electrical Ltd., Century House, Shaftesbury Avenue, W.C.2.

In Hong Kong they . . .

In the business heart of Hong Kong, Britain's hundred year old Crown Colony, stands this imposing new office building, Alexandra House.

The building is owned by The Hong Kong Land Investment & Agency Co. Ltd., and 120,000 yards of HENLEY CABLES were installed for 2,000 lighting outlets, 600 power sockets and five lifts which service fourteen floors.

BY APPOINTMENT ELECTRIC CABLE MANUFACTURERS

. . . let

HENLEY CABLES

carry the current

Architects:
Spence Robinson & Partners

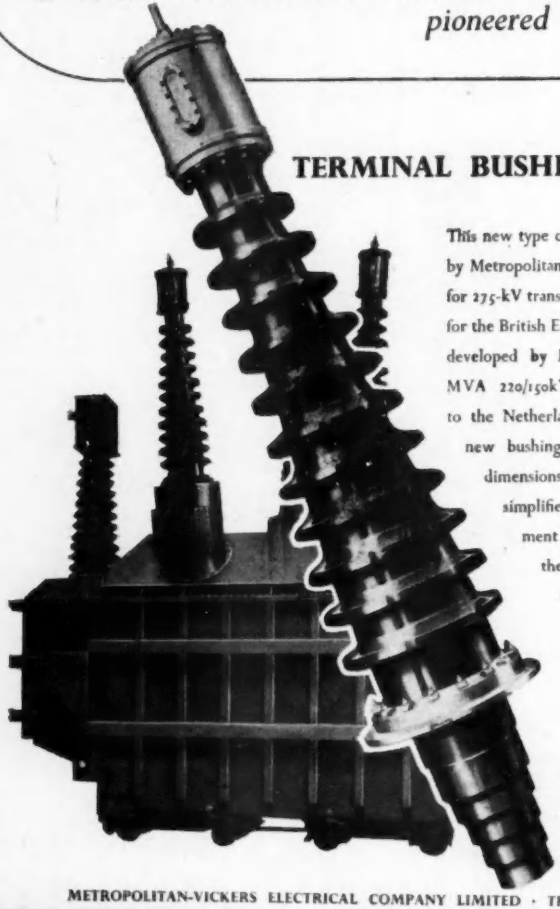
Electrical Contractors:
THE JARDINE ENGINEERING CORPORATION LTD.

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD., 51-53 HATTON GARDEN, LONDON, E.C.1

Technical progress in

TRANSFORMERS

pioneered by Metrovick



TERMINAL BUSHING FOR 275kV

This new type of terminal bushing, as used first by Metropolitan-Vickers, has been standardised for 275-kV transformers now under construction for the British Electricity Authority. Originally developed by Metrovick for use with a 100 MVA 220/150kV three-phase group supplied to the Netherlands Government in 1949, the new bushing considerably reduces overall dimensions, improves reliability and simplifies construction. This development provides a typical example of the advance in progress throughout the electrical industry made possible by Metrovick research and practical experience.

METROPOLITAN-VICKERS ELECTRICAL COMPANY LIMITED · TRAFFORD PARK · MANCHESTER 17.
Member of the A.E.I. group of companies

METROVICK *Transformer Design Leads the Way*

EAA 202

CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WORK WANTED WANTED · FOR SALE

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia Street, London W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 42s. per inch, and all other classified advertisements at 3s. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

COUNTY BOROUGH OF BARNSLEY

Borough Engineer and Surveyor's Department.

TENDERS FOR TOWER WAGON AND 10 CWT. VAN

TENDERS are invited for the supply and delivery of one or both of the following:—

(a) One TOWER WAGON on 4-ton long wheelbase chassis, platform height of tower when raised to be 25 ft and overall height when lowered to be 13 ft. The vehicle to include a driver's and linesman's cab as an integral unit and to contain a 20-gallon water tank and wash-bowl sink, the cab to be fitted with work bench and vice. The body-work to be painted and lettered to requirements.

(b) One 10 cwt. VAN with ladder fittings to roof of the van. The body to be painted and lettered to requirements.

Tenders accompanied by specifications, illustrations and details of period and conditions of guarantee together with approximate delivery date, should be forwarded in an envelope endorsed "Tender for Tower Wagon and/or 10 cwt. Van," to reach the undersigned not later than Tuesday, March 24, 1953.

The Council do not bind themselves to accept the lowest or any tender.

A. E. GILFILLAN,
Town Clerk.

Town Hall,
Barnsley.
March, 1953. (D 105)

CITY OF MANCHESTER

THE ESTATES MANAGEMENT COMMITTEE invite tenders for the ELECTRICAL INSTALLATION required at shops, maisonettes and garages, Brookland, Main Centre, Wythenshawe; specification and drawings together with tender form, may be obtained from the City Architect, Town Hall. Deposit £1 1s. (returnable). Tenders, sealed in endorsed envelopes, must be delivered before 10 a.m. on Tuesday, March 24, 1953.

PHILIP B. DINGLE,
Town Clerk.

February 25, 1953. (D 61)

ISLINGTON BOROUGH COUNCIL

ISLINGTON BOROUGH COUNCIL invite tenders from electrical contractors for the INSTALLATION of fluorescent lighting fittings, wiring, etc., in the Council's Library, Essex Road.

Tender documents, which may be obtained from the Borough Engineer and Surveyor, Town Hall, Upper Street N.1, are returnable by April 14, 1953. (D 99)

APPOINTMENTS VACANT

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

NORTH WESTERN ELECTRICITY BOARD

APPOINTMENT OF LINESMAN (OVERHEAD POWER)
Blackburn District.

RATE OF PAY: 40·5d. per hour. N.J.I.C. conditions.

Applications to Sub-Area Manager, No. 5 Sub-Area, The North Western Electricity Board, Jubilee Street, Blackburn, by March 14, 1953. (D 63)

KENT COUNTY COUNCIL

APPLICATIONS are invited for the appointment in the Building Department of an ENGINEERING INSPECTOR at a salary in A.P.T. Grade V (£595-£645).

Applicants must have had good practical experience in the design and installation of equipment in one or more of the following: viz. (a) electrical installations for buildings; (b) low-pressure hot water heating and domestic hot and cold water systems; (c) steam services associated with heating and cooking installations.

Preference will be given to members of the Institution of Heating and Ventilating Engineers or the Institution of Electrical Engineers.

Applications, on forms obtainable from the County Architect, Springfield, Maidstone, must be delivered to him within 14 days of the appearance of this advertisement.

W. L. PLATTS,
Clerk of the County Council.

County Hall, Maidstone.
February 25, 1953. (D 84)

CEYLON FIRE INSURANCE ASSOCIATION

THE Ceylon Fire Insurance Association invite applications from JUNIOR ENGINEERS for the post of Assistant Inspector. Applicants should be about 30 years of age and unmarried. They must be technically qualified, holding not less than the Ordinary National Certificate in electrical engineering or its equivalent, and have received a comprehensive general engineering apprenticeship in the electrical mechanical fields. Practical experience in the wiring of buildings for both power and lighting installations together with a good working knowledge of the I.E.E. Wiring Regulations essential. Knowledge of sprinkler installations and ordinary fire protection equipment for buildings an advantage. The work is chiefly connected with the inspection and drafting of reports on the condition of electrical/mechanical and fire extinguishing equipment in tea factories. Application forms and details of terms of engagement from the Secretary, Fire Offices' Committee (Foreign), 65 Watling Street, London E.C.4. (D 43)

LONDON ELECTRICITY BOARD

DEMONSTRATOR (FEMALE)

APPLICATIONS are invited for the above position in the Islington District of the Northern Sub-Area.

Applicants should be suitably qualified, holding the E.A.W. or other approved certificate including electrical housecraft, and have experience in conducting demonstrations at Service Centres and in general Service Centre duties. They should also be experienced in advising consumers on the selection and use of domestic appliances, both at the Service Centre and on consumers' premises.

The post is graded within the National Joint Council Agreement (Administrative and Clerical Grades) as Grade I, i.e. £380 to £470 per annum, plus the appropriate London Allowance.

Application forms from Establishments Officer, 46 New Broad Street, E.C.2, to be returned completed by March 14, 1953. Please enclose addressed foolscap envelope and quote ref. V/1576/T on all correspondence. (D 45)

THE BRITISH IRON AND STEEL RESEARCH ASSOCIATION

ELECTRICAL ENGINEER required by the Plant Engineering Division of the above Association to carry out applied research in the iron and steel industry. Honours degree in electrical engineering essential. Age range 23 to 28. Starting salary according to age, qualifications and experience. Post is superannuated under the F.S.S.U. Location of work, London.

Written applications only to Personnel Officer, B.I.S.R.A., 11 Park Lane, London W.1. (D 36)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

APPLICATIONS are invited for the following positions in the Division:

ASSISTANT SECTION ENGINEER

Coventry Section Office (Vacancy No. 31/53)

Applicants should have received a first-class technical education and should be corporate or graduate members of the I.E.E. and must have had experience in the maintenance and operation of high voltage overhead lines and outdoor transformer and switching stations. Experience of 132 kV equipment would be an advantage.

Commencing salary will be in accordance with Grade 6, Class "AX.DX," of Schedule "C" of the N.J.B. Agreement (£584-£787 per annum), and will commence at a point commensurate with qualifications and experience.

SECTION ENGINEER

Drakelow (Vacancy No. 28/53)

The successful applicant will be required to take charge of a new section to be established at Drakelow, near Burton-on-Trent.

The section will contain extensive 275 kV and 132 kV equipment and the candidates must have had wide experience in the maintenance and operation of 132 kV lines and substations in a transmission section.

Preference will be given to candidates who are corporate members of the Institution of Electrical Engineers or hold equivalent qualifications.

Salary will be in accordance with Grade 4, Class "AX.DX," of Schedule "C" of the N.J.B. Agreement (£763-£976) per annum).

The closing date for these appointments will be March 23, 1953.

CIVIL ENGINEERING DRAUGHTSMEN

Construction Department, North Wilford
(Vacancy No. 22/53)

Candidates should have experience in design and detail of reinforced concrete structures, piled and slab foundations for heavy plant, culverts, cable subways, etc., or general building construction, drainage and sanitation schemes, associated with offices and administrative buildings.

The salary will be in accordance with Grade 5 (£567-£671 per annum) or Grade 6 (£433-£567 per annum) of Schedule "D" of the National Joint Board Agreement.

The above positions will be pensionable within the provisions of the British Electricity Authority and Area Boards superannuation scheme.

Applications should be submitted on Form A.E.6/ACT, which may be obtained from the Divisional Establishments Officer, British Electricity Authority, Barker Gate, Nottingham, and returned to the undersigned by the date stated. Please quote vacancy number.

L. F. JEFFREY,
Divisional Controller.
(D 67)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following superannuable position. Salary and conditions of service will be in accordance with the National Joint Board Agreement.

ASSISTANT ENGINEER (EFFICIENCY AND TESTING)
Little Barford Generating Station.

Salary, Class "G," Grade 7, £729 to £758 per annum.

Applicants should possess the Higher National Certificate in Mechanical and/or Electrical Engineering or other equivalent qualifications and have had previous experience in a large generating station fired with pulverised fuel.

The successful applicant will be responsible for the efficient and economical operation of the generation plant, the preparation of statistics and the keeping of technical records.

Applications, giving age and details of qualifications and experience, should be submitted to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, N.14, to arrive not later than March 14, 1953.

W. N. C. CLINCH,
Controller.
(D 67)

BRITISH ELECTRICITY AUTHORITY

North Western Division

GENERAL ASSISTANT ENGINEER required for Planning and Development Section of Technical Department at Divisional Headquarters. Candidates should preferably hold an engineering degree or have attained Higher National Certificate standard. Works experience in switchgear and protection would be an advantage. Salary commencing £501, rising to £714 (N.J.B. Schedule "C," Grade 8). Apply to Establishments Officer, British Electricity House, 825 Wilmslow Road, Manchester 20, before March 14. Quote Vacancy No. 31/53. (D 44)

HERTFORDSHIRE COUNTY COUNCIL

County Architect's Department

ASSISTANT ELECTRICAL ENGINEER, Grade IV (£555-£600). Applicants should hold at least the Ordinary National Certificate in Electrical Engineering, and need not have had previous local government experience.

Applications, with names and addresses of three referees, to the County Architect, County Hall, Hertford, Herts, by March 18. (D 68)

MIDLANDS ELECTRICITY BOARD

APPLICATIONS are invited for the following superannuable posts:

JUNIOR ENGINEER

Wolverhampton and District Sub-Area Headquarters

Technical qualifications desirable. Salary within the range of £390-£525 p.a., according to experience (N.J.B. Grades "K," 19/"K," 15). Applicants should have had sound general engineering training with some experience in fault calculation and E.H.T. cable laying contracts.

Apply, in writing, within 14 days, stating age, salary and present position, to: F. J. Elliott, Sub-Area Manager, Midlands Electricity Board, 83 Darlington Street, Wolverhampton.

DEMONSTRATOR (FEMALE)

Ludlow District, Shropshire, and Herefordshire Sub-Area

Duties involve lecture demonstrations in service centres and on consumers' premises and advice to consumers on the selection and use of electrical apparatus. Salary: £380-£470 p.a. (N.J.C. Grade 1).

Apply, within 14 days, stating age, education, qualifications, training and experience, to: Sub-Area Manager, Midlands Electricity Board, Spring Gardens, Ditherington, Shrewsbury.

A. STEPHENS,
Secretary.
(D 76)

BRITISH ELECTRICITY AUTHORITY

London Division

APPLICATIONS are invited for the following superannuable posts. Salary, including London Allowance, and conditions of service in accordance with N.J.B. Agreement, Schedule A or C.

SECOND ASSISTANT TO GENERATION ENGINEER (OPERATION)
Group IV, H.Q.

Qualifications: Higher National Certificate (electrical or mechanical) with, preferably membership of a recognised institute. Power station operational maintenance experience necessary with ability to discuss station efficiency problems with station supervisory staff using own initiative. Administrative experience an advantage. Salary, Class "AX," Grade 2—£875 14s. to £1,018 10s. rising to ultimate maximum, Class "EX"—£1,133 p.a.

SHIFT CHARGE ENGINEER
West Ham Generating Station

Qualifications: Sound technical training in electrical and mechanical engineering and practical experience in operation and maintenance of modern generating plant. Character and ability to deal with staff problems is important. Salary, Class "H," Grade 7—£810 12s. p.a.

ASSISTANT MAINTENANCE ENGINEER (ELECTRICAL)
Barking "C" Generating Station

Qualifications: Sound technical training to Higher National Certificate standard, extensive experience in maintenance of modern e.h.t. and l.t. switchgear, motors, alternators and all electrical and auxiliary plant appertaining to a large generating station. Experience in control of labour essential. Salary, Class "J," Grade 8—£802 4s. p.a.

ASSISTANT MAINTENANCE ENGINEER (MECHANICAL)
Barking "C" Generating Station

Qualifications: Sound technical training to Higher National Certificate standard preferred with wide experience in maintenance of modern generating plant and control of labour. Duties include organising and planning of overhauls of turbine and boiler plant and associated equipment. Salary, Class "J" Grade 8,—£802 4s. p.a.

ENGINEERING DRAUGHTSMAN
Acton Lane Generating Station

Candidates should be capable of performing duties which necessitate technical calculations and be familiar with drawing office routine generally, be neat and quick workers with technical qualifications up to at least Ordinary National Certificate standard. Salary, Schedule D, Grade 6—£458 p.a.

Applications may be made on form obtainable from Divisional Secretary, B.E.A. London Division, Generation House, Gt. Portland Street, W.1, and be returned within 14 days of this advertisement. (D 85)

SOUTH EASTERN ELECTRICITY BOARD

SUB-AREA PURCHASING AND STORES ASSISTANT
Kent Sub-Area, Rochester

SALARY, £640 by 20 to £700 p.a. under N.J.C. Grade 5. Superannuable. Applicants should have a knowledge of electrical engineering equipment and electrical appliances, ordering procedure, control of stock and have administrative ability.

Applications, giving two referees, must reach H. F. Knell, J.P., M.I.E.E., Kent Manager, SEEBoard, 178/184 High Street, Rochester, Kent, by March 18, 1953.

A. L. BURNELL,
Secretary.

February, 1953. (D 86)

KUMASI COLLEGE OF TECHNOLOGY

(Principal: J. P. Andrews, D.SC., F.INST.P.)

APPLICATIONS are invited for appointment as:—
(1) LECTURER in Automobile Engineering and Vehicle Technology.
(2) WORKSHOP ELECTRICIAN.

(1) must be A.M.I.M.E., or hold Higher National Certificate, (2) must have had apprenticeship and subsequent experience as electrician on installation work and in care of instruments, and hold City and Guilds qualification in Installation Work or Ordinary National Certificate in Electrical Engineering.

Posts are pensionable. (In exceptional circumstances temporary appointment could be made.) Salary scales:—Lecturer, £798 to £1,450 p.a.; Electrician, £798 to £1,147 p.a.
including overseas pay and temporary cost-of-living allowance of approximately 15 per cent. of basic salaries (£540 to £1,000 and £540 to £780 respectively). Point of entry according to qualifications and experience. Partly furnished bungalows provided, rent approximately 10 per cent. of basic salary. Free first class passages, once each way for each tour of service, for persons appointed, their wives, and up to three children under 13. Income tax at Gold Coast rates, much lower than United Kingdom rates. Generous home leave on full salary.

Write for further information to Secretary, Advisory Committee on Colonial Colleges, 15 Victoria Street, London S.W.1. Closing date for applications March 31, 1953. (D 62)

YORKSHIRE ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments:—

No. 4 (Leeds) Sub-Area

SECOND ASSISTANT ENGINEER
(Estimating, Installation and Appliance Maintenance)

Applicants must have a sound technical and practical training in all types of electrical contracting work and be capable of preparing and supervising schemes relating to all aspects of utilisation.

A practical knowledge of changeover schemes will be an advantage and it is essential that the applicant has had experience in the control of workmen.

Salary: N.J.B. Class "K," Grade 7, £869 to £907 per annum.

Applications, giving full details of age, qualifications and experience should be forwarded to the Manager, No. 4 (Leeds) Sub-Area, Yorkshire Electricity Board, Bramhope, Leeds, not later than March 19, 1953.

No. 2 (Huddersfield) Sub-Area

Halifax District.
CONSUMERS' ENGINEER

Applicants should preferably be Corporate Members of the Institution of Electrical Engineers or hold equivalent qualifications and should have had extensive experience in all the commercial activities of a district organisation, including negotiation with all classes of consumers.

Salary, N.J.B. Class "G," Grade 8, £678 to £704 per annum.

Applications, giving full details of age, qualifications and experience should be forwarded to the Manager, No. 2 (Huddersfield) Sub-Area, Yorkshire Electricity Board, Market Street, Huddersfield, not later than March 19, 1953.

No. 7 (Grimsby) Sub-Area

Scunthorpe District.
SALES REPRESENTATIVE

Applicants will be required to give advice within well defined instructions and under close supervision to both urban and rural consumers in respect of new supplies and sales of domestic and agricultural equipment. They should be able to advise consumers on all types of domestic and agricultural installations and prepare estimates in this connection.

Salary, N.J.C. Grade 1, £380 by £470 per annum.

Applications, giving full details of age, qualifications and experience should be forwarded to the Manager, No. 7 (Grimsby) Sub-Area, Yorkshire Electricity Board, Moss Road, Grimsby, not later than March 19, 1953. (D 65)

ELECTRICITY CORPORATION OF NIGERIA

THE ELECTRICITY CORPORATION OF NIGERIA is the Electricity Supply Authority for Nigeria and has the following vacancies on its Staff. Normal tours would be 18 to 24 months. Several of the posts will be permanent, subject to a satisfactory probationary period of three years service. Other posts are on Contract Terms and carry a gratuity instead of pension. The salaries shown are basic and carry, in addition, an Expatriation Allowance of £180 per annum on basic salaries up to £770, £240 on salaries from £771 to £1,089, and £270 on salaries from £1,090 to £1,299. Salaries and allowances are paid monthly. Contract salaries are slightly higher and the gratuity is payable in a lump sum on termination of services. Accommodation will be available for every man appointed, usually in quarters furnished with hard furniture (for which a rental not exceeding 10 per cent. of salary is charged). Medical fitness essential. First class air fares out and home for Officer and wife, with assisted passages or U.K. maintenance allowance for up to two children under 16. Liberal leave on full pay. Outfit allowance of £80 upon first appointment. Forms of application and further particulars from The Liaison Officer, Electricity Corporation of Nigeria, 11 Manchester Square, London W.1.

ASSISTANTS TO CONSUMERS' ENGINEER. Two appointments, £660 by £25 to £800 plus expatriation allowance. Candidates should hold National Certificates and have served an apprenticeship in an electrical trade (supply) followed by experience in consumer's installation works and the commercial side of a supply Authority.

CHEMIST. An Assistant Chemist, B.Sc., preferably with power station experience. Salary scale, £800 by £40 to £1,000 and by £50 to £1,300 per annum, plus expatriation allowance.

CHIEF STOREKEEPER. £1,000 by £50 to £1,300 plus expatriation allowance. Essentially experienced as a senior storekeeper with an electricity Authority or large electrical contractors. Able to train European and African staff and to organise and set up new stores at out-stations.

ELECTRICAL ENGINEER. Four appointments will be made. One Senior at £1,400 per annum, plus expatriation allowance, and three within the range of £660 by £40 to £1,000 thence by £50 to £1,300 per annum, plus expatriation allowance; starting point according to age, qualifications and experience. Essential qualifications are Corporate Membership of the I.E.E., sound technical training, and wide knowledge of construction and operation of o.h. and u.g. distribution systems up to 11 kV. The Senior man should have experience of e.h.t. transmission up to 132 kV.

MECHANICAL ENGINEERS (GRADE 1). Two appointments in the Scale £660 by £40 to £1,000, thence by £50 to £1,300 per annum, plus expatriation allowance. Starting point according to age, qualifications and experience. Essential qualifications are Corporate Membership I.Mech.E., plus sound knowledge and experience of steam-raising plant, turbo-generators, and internal combustion engines.

SENIOR ACCOUNTANT. Two appointments, £1,000 by £50 to £1,300 plus expatriation allowance. Chartered or Incorporated Accountants. Experience in electricity accounts essential and a knowledge of machine accounting an advantage. Experience of accounting controls, costing and organisation of sub-offices essential. (D 64)

SOUTH WALES ELECTRICITY BOARD

REQUIRED, SUB-AREA COMMERCIAL OFFICER in the Central Sub-Area of the Board, based on Cardiff.

The salary from the date of appointment will be established in accordance with the decisions of the National Joint Managerial and Higher Executive Grades Committee, and will be determined provisionally in accordance with qualifications and experience.

Applications, stating age, present position and salary, qualifications and experience, and giving three referees, to be addressed to the Secretary, to arrive by March 14, 1953.

D. G. DODDS,
Secretary.

St. Mellons, Cardiff. (D 81)

NORTH EASTERN ELECTRICITY BOARD

Harrogate Sub-Area

APPLICATIONS are invited for the appointment of FIRST ASSISTANT DISTRICT COMMERCIAL ENGINEER at Harrogate. Applicants should have a sound technical and practical training and have experience in all aspects of service to domestic, commercial and smaller industrial consumers. Salary: Schedule "A," Class "E," Grade 6, £699-£725, N.J.B. conditions of service.

Applications, stating age, qualifications and experience, should be forwarded to the Secretary (Establishments), The North Eastern Electricity Board, Carliol House, Newcastle-upon-Tyne, 1, within 10 days of the appearance of this advertisement. (D 83)

BRITISH ELECTRICITY AUTHORITY

South Eastern Division

APPLICATIONS are invited for the following GENERAL ASSISTANT ENGINEER vacancies in the Divisional Transmission Engineer's Department.

(1) The successful applicant will be based at Divisional Headquarters, Kingston, and his duties will include the examination of specifications and associated drawings relating to new schemes. The ability to lay out equipment and make preliminary drawings would be an advantage.

(2) The successful applicant will be based at Brighton and candidates should preferably have had experience in either the construction or maintenance of steel tower overhead lines and e.h.t. switchgear and transformers. Preference will be given to applicants for either of these positions who possess Higher National Certificates. N.J.B. conditions of service and salary for both positions. Class "AX/DX," Grade 8, £501 to £639 p.a. plus London Allowance for position (1). Applications, giving details of present position, experience, education, etc., should be received by the Establishments Officer, Lower Ham Road, Kingston-upon-Thames, not later than March 16, 1953. (D 66)

SOUTH WALES ELECTRICITY BOARD

REQUIRED, DISTRICT COMMERCIAL MANAGER, District 348 (Cardiff West).

Applicants must have had experience in the application of electricity in all its branches; negotiation of supplies, public lighting and contracting.

Salary in accordance with Class "E," Grade 3 (£858-£876-£894) of N.J.B. Schedule.

Applications, stating age, present position and salary, qualifications and experience, and giving three referees, to be addressed to the Secretary, to arrive by March 14, 1953.

D. G. DODDS,
Secretary.

St. Mellons, Cardiff. (D 78)

NORTH EASTERN ELECTRICITY BOARD

Wear Sub-Area

APPLICATIONS are invited for the appointment of DISTRICT COMMERCIAL ENGINEER at South Shields District. Applicants should be corporate members of I.E.E. or possess equivalent qualification in electrical engineering, and have experience in the utilisation of electrical energy in commercial and domestic premises, knowledge of installation work, and be conversant with tariffs, sales and all aspects of consumer service. Salary: Schedule "A," Class "E," Grade 4, £803-£834. N.J.B. conditions of service.

Applications, stating age, qualifications and experience, should be forwarded to the Secretary (Establishments), The North Eastern Electricity Board, Carliol House, Newcastle-upon-Tyne, 1, within 10 days of the appearance of this advertisement. (D 82)

SOUTH WALES ELECTRICITY BOARD

REQUIRED, FIRST ASSISTANT to District Commercial Manager, District 345 (Pontypridd).

Applicants must have had experience in the application of electricity to domestic, commercial and industrial premises, public lighting and in electrical contracting.

Salary in accordance with Class "E," Grade 5 (£740-£757-£774) of the N.J.B. Schedule.

Applications, stating age, present position and salary, qualifications and experience and giving three referees, to be addressed to the Secretary, to arrive by March 14, 1953.

D. G. DODDS,
Secretary.

St. Mellons, Cardiff. (D 79)

CONSULTING ENGINEERING

A. N. IRENS, M.I.E.E., Consulting Engineer, invites applications from suitably qualified and experienced persons for the position of SENIOR ASSISTANT ELECTRICAL ENGINEER on his Belfast Office Staff. Candidates should be about 30 years of age, residing or willing to reside in Belfast; have served a practical electrical apprenticeship; possess technically Higher National Certificate or higher qualification; have held a responsible position in consulting engineering or in the contracting industry; be experienced in the preparation of specifications and working drawings and in the control and supervision of junior staff.

The successful candidate will be offered a commencing salary of £650-£750 per annum, according to experience, and will be eligible for participation in a superannuation scheme.

Applications should give concisely, in chronological order, details of age, training, qualifications, experience and present position, and be addressed to A. N. Irens, M.I.E.E., Consulting Engineer, 46 Donegall Street, Belfast, with envelope endorsed "Electrical Engineer." (D 89)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

APPLICATIONS are invited for the following appointment in the Board's No. 2 Sub-Area:—

GENERAL ASSISTANT ENGINEER

Sub-Area Headquarters, Electricity House, Sandiway, near Northwich, Cheshire.

Salary £583 to £605 per annum (N.J.B. K.13).

Applicants should preferably be in possession of a Higher National Certificate or an equivalent qualification in electrical engineering. Practical experience in the commissioning of protective systems will be an advantage.

The duties of the post will include the testing of relays and protective gear, h.v. and transformer testing, including site testing.

The appointment is superannuable and subject to medical examination.

Applications, on the Standard Application Forms, should be forwarded to the Manager, No. 2 Sub-Area, M.A.N.W.E.B., above address, quoting reference 114A. Closing date: March 16, 1953. (D 46)

SOUTH WALES ELECTRICITY BOARD

REQUIRED, ASSISTANT ENGINEER (Substations) in District 226 (Llanelly).

Applicants should have experience of construction and maintenance work in all types of a.c. substations up to 33 kV, and should preferably also have experience in the operation and maintenance of rotary conversion plant.

Salary in accordance with Class "E," Grade 7 (£649-£665-£681) of N.J.B. Schedule.

Applications, stating age, present position and salary, qualifications and experience, and giving three referees, to be addressed to the Secretary, to arrive by March 14, 1953.

D. G. DODDS,
Secretary.

St. Mellons, Cardiff. (D 77)

BRITISH ELECTRICITY AUTHORITY

Southern Division

(S/13.386)

APPLICATIONS are invited for the following positions:

(a) ELECTRICAL ENGINEERING DRAUGHTSMAN
Construction Department

Applicants should have had experience of the layout of switchgear, cables and lighting in connection with power station construction. Experience in schematic diagrams an advantage.

(b) MECHANICAL ENGINEERING DRAUGHTSMAN
Construction Department

Applicants should have had experience of work concerning turbines and auxiliaries, boilers and auxiliaries, coal and ash handling plant and pipework.

Salary: N.J.B. Schedule "D," Grade 5 (£567-£671), or Grade 6 (£433-£567), according to qualifications and experience.

Application forms, obtainable from P. D. A. Oliver, Divisional Secretary, British Electricity House, High Street, Portsmouth, must be returned by March 18, 1953. (D 75)

SOUTH WALES ELECTRICITY BOARD

REQUIRED, SECTION HEAD (Industrial Supplies) in Commercial Department of the Board at Head Office, St. Mellons.

Applicants should be suitably qualified with a wide experience in the negotiation of large industrial supplies.

The salary from the date of appointment will be established in accordance with the decisions of the National Joint Managerial and Higher Executive Grades Committee, and will be determined provisionally in accordance with qualifications and experience.

Applications, stating age, present position and salary, qualifications and experience, and giving three referees, to be addressed to the Secretary, to arrive by March 14, 1953.

D. G. DODDS,
Secretary.

St. Mellons, Cardiff. (D 80)

APPLICATIONS are invited for the position of SENIOR TRANSFORMER DESIGN ENGINEER for transformers up to 10,000 kVA at 66 kV. Housing accommodation available.—Please apply, giving full details of qualifications and experience, to Box 2393, Electrical Times, marking your application "Senior Transformer Engineer." (D 26)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

A CABLE COMPANY requires an experienced BUYER with some knowledge of non-ferrous metal markets and the purchasing of engineering stores. A public school or equivalent education desirable. The appointment is pensionable and will carry a good salary. Replies will be treated in the strictest confidence and interviews arranged for the convenience of applicants, who should state detailed experience in chronological order, salaries earned and required.—Replies to Box No. 2465, Electrical Times. (D 106)

A LARGE ELECTRICAL ENGINEERING COMPANY in the Midlands invites applications from suitable candidates for the appointment of PRODUCTION ENGINEER. The appointment involves responsibility for production processes and methods, design and manufacture of jigs and tools etc. and wide experience in the application of time study methods in the engineering industry. An engineering degree is desirable but not essential and, in addition, a successful record of experience in a similar high level capacity.—Applicants are asked to send full details to Box No. 2457, Electrical Times. (D 72)

A WELL-KNOWN COMPANY in the Midlands requires a JUNIOR TRANSFORMER DESIGN ENGINEER. Previous experience of this type of work is essential. Housing assistance may be offered to suitable candidates. —Apply with full details, quoting Ref. BBE, to Box No. 2395, Electrical Times. (D 27)

ASSISTANT ENGINEERS experienced in the survey and construction of overhead transmission lines in Scotland, mainly wood pole types.—Details of age, education, experience and salary to Box No. 732, Keith and Co., Advertising Agents, Edinburgh. (D 68)

B.B.C. requires two ENGINEERS in Wiring Unit of Planning and Installation Department based London. Salary, £590 to £800. To plan, prepare estimates and specifications, conduct correspondence, for low/medium pressure electrical installation work in studios and offices; and to supervise and test work of contractors. Considerable experience similar work essential; electrical apprenticeship desirable. Must be willing to travel throughout U.K.—Applications to Engineering Establishment Officer, B.B.C., London, W.1, within seven days. (D 101)

BRITISH ELECTRICITY AUTHORITY (South West Scotland Division) requires a CHIEF GENERATION ENGINEER (OPERATION) at Divisional Headquarters, Glasgow. The commencing salary will be according to qualifications and experience, but will be within the existing range of £1,575 to £2,000 per annum, which is provisional pending the negotiation of the permanent salary scale.

Applications stating age, present position and salary, and giving full details of qualifications and experience should be forwarded to D. Moffat, Director of Establishments, British Electricity House, Winsley Street, London W.1, by March 23, 1953. Quote reference AE/338. (D 107)

SOUTH AFRICA

A Technical Switchgear Sales Engineer

with experience in Tendering, Estimating and Sales Works required by our South African branch. Salary according to qualifications and experience. Good pension and life assurance schemes, permanent situation. Apply, stating age, experience and salary required to the

Employment & Welfare Manager
JOHNSON AND PHILLIPS LIMITED
Charlton, London, S.E.7

(D 90p)

JOHNSON & PHILLIPS, LIMITED
CHARLTON, S.E.7

MANAGER OF SWITCHGEAR DEPARTMENT

APPLICATIONS are invited from well qualified Engineers with considerable experience in the switchgear industry for the appointment of Manager, Switchgear Department.

The successful applicant will be required to take full responsibility for design, development, production and the commercial conduct of this increasingly important section of the Company's activities. He will also be required to exercise overall technical control of the activities of the Company's switchgear factories overseas.

Applications, which will be treated in strict confidence, should be addressed to:—

The Managing Director,
JOHNSON & PHILLIPS, LIMITED,
CHARLTON, LONDON, S.E.7. (D 70p)

B.B.C. requires two DRAUGHTSMEN for Planning and Installation Dept. in Central London, to prepare and alter drawings of wiring and equipment installations. Some training engineering drawing and tracing, with elementary knowledge electrical installations and symbols required. Salary £7 16s. to £9.—Applications to Engineering Establishment Officer, B.B.C., London, W.1, within seven days. (D 100)

BRITISH ELECTRICITY AUTHORITY require a CONVEYANCING CLERK (Unadmitted) in the Legal Department at their Headquarters in London. Experience of conveyancing matters essential and the successful applicant will be expected to carry them through to completion under supervision.

Salary N.J.C. Grade 3, £550 by £20 to £610. Pension scheme.

Applications stating age, experience, present position and salary to D. Moffat, Director of Establishments, British Electricity House, Winsley Street, W.1, by March 21, 1953. Please quote AE.336. (D 47)

CABLE ESTIMATOR required by old-established cable company in S.E. London. Experience of paper, rubber and plastic cables desirable.—Replies, stating age, experience and salary required, to Box No. 2451, Electrical Times. (D 52)

DRAUGHTSMEN, experienced preferred, required urgently on development of electric domestic appliances, refrigerators, washing machines and heating units, etc. Salary commensurate with age and qualifications. Pension scheme, 40-hour week. Interview expenses paid. —Apply first in writing, giving full practical and technical qualifications, age, etc., to Chief Draughtsman, The Hotpoint Electric Appliances Co., Ltd., Peterborough. (D 108)

DRAUGHTSMEN. The English Electric Company, Limited, have vacancies at their Liverpool works for Electro/Mechanical Draughtsmen for interesting work on a wide variety of new projects. The essential requirements are previous experience as a draughtsman, on the design and detail of any kind of electro-mechanical equipment, mechanisms, or welded fabrications for batch production. Modern houses are available for selected applicants and travelling expenses for interviews will be paid.—Write, giving full details of age, qualifications and experience, to Central Personnel Services, Marconi House, 336/7 Strand, London W.C.2, quoting ref. 1099. (D 53)

ELECTRICAL DRAUGHTSMEN required for maintenance and development work.

Applicants should have undergone a recognised training course and have good technical training. Experience in the layout of steel works, electrical plant and a knowledge of diagrams is desirable.

Applications, in own handwriting giving age, training and experience etc., should be sent to The Personnel Superintendent, The Steel Company of Wales Ltd., P.O. Box No. 3, Port Talbot. (D 102)

ELECTRICAL TESTER required with experience in high tension apparatus and associated controlling and electronic equipment up to 50 kW capacity. Good opportunity for man between 30 and 40 years of age and offering a position of responsibility.—Write, stating technical qualifications, experience, age and salary required to A. E. Dean and Co., (X-ray Apparatus) Ltd., 25 Progress Way, Waddon, Surrey. (D 50)

EXPERIENCED STOREKEEPER required for Luton branch E.W.F. electrical wholesalers.—Young & Wildsmith, Ltd., 13 Collingdon Street, Luton, Beds. (D 55)

ENGINEER INSPECTOR/ERECTOR required for India by accumulator manufacturers. Applicants should be single and not more than 30 years of age and have experience with self-contained lighting plants and accumulators.—Apply, Box No. 2455, Electrical Times. (D 69)

FITTER (ELECTRICAL) required by the British Electricity Authority, Merseyside and North Wales Division, Wirral Section, Transmission Department. Applicants should be experienced in working on h.v. transformer and switchgear. N.J.I.C. conditions, rate of pay 3/6½ per hour, 44-hour, 5-day week.—Applications, stating age, experience and present employment, to: Divisional Secretary, Beaconsfield Road, Woolton, Liverpool. Closing date, March 14, 1953. (D 91)

JUNIOR ENGINEER as internal technical sales assistant, age 23-30 years. Qualifications: Higher National Certificate, though in exceptional cases an Ordinary Certificate or lower age will be considered. Previous sales experience and ability to handle correspondence is necessary—Applications should be addressed to the Chief Personnel Officer, Pilkington Brothers, Ltd., St. Helens, Lancashire. (D 48)

JUNIOR or ASSISTANT ESTIMATOR for old-established electrical contractors in W.1 district. Salary: £550-£650, according to experience.—Box No. 2459, Electrical Times. (D 93)

PLUMBER JOINTERS (Journeymen) required for Eire and Midlands. London rate of pay.—Write, giving details of previous experience, to Box No. 2449, Electrical Times. (D 51)

STORES ASSISTANT, knowledge of electrical material. —Write experience, age, wages required, F. H. Wheeler and Co., 39 Victoria Street, S.W.1. (D 103)

TECHNICAL ASSISTANT required by W. T. Glover and Co., Ltd., Trafford Park, Manchester, manufacturers of paper-insulated cables up to the highest voltages. Degree or H.N.C. standard desirable. Situation calls for dealing with technical enquiries, specifications and general technical matters. Age 22 to 30 years. Salary in accordance with qualifications and experience. Good prospects.—Applications should be addressed to the Secretary. (D 92)

TECHNICAL SALES ASSISTANT required for large electrical instrument and engineering company in the West London area. Age about 25. Higher National Certificate.—Write, in detail, regarding education, experience, and salary required, Box No. 2461, Electrical Times. (D 94)

TECHNICAL SALES REPRESENTATIVE, 25-30, preferably with a knowledge of the application of electrical ceramics and a good engineering background, required to cover the entire country. Commencing salary £500 a year.—Box No. 2447, Electrical Times. (D 49)

TESTER required to take charge of inspection and test in electrical motor repair shop, also arc welding equipment and other appliances.—Max Arc and Electrics, Ltd., Terrace Road, Walton-on Thames, Surrey. (D 71)

THE LANCASHIRE STEEL CORPORATION LTD., Irlam Works, Manchester, require ELECTRICIANS for general duties. Must have knowledge of heavy industrial plant installation, including switchgear and cabling work. Good bonus rates and prospects for suitable men.—Apply in writing to the Labour Manager. (D 42)

TRANSFORMER ENGINEER DESIGNER required for works in the London area with experience of 132-kV and higher voltages. Applications will be treated confidentially and should give particulars of age, experience and salary required.—Apply Box No. 2389, Electrical Times. (D 25)

TRANSFORMERS (WATFORD), LTD., Sandown Road, Watford, have vacancies for DRAUGHTSMEN fully experienced on all types of transformers up to 10,000 kVA. Please state age, experience and salary expected. (D 54)

WINDER, London area, all types of a.c. and d.c. rewinds, preferably accustomed low-voltage work. Steady appointment for suitable man.—Age, experience to Box No. 2399, Electrical Times. (D 28)

WORK WANTED

A.C. and d.c. MOTOR REWINDS and REPAIRS. Prompt service fully guaranteed. Edgware 5566 (4 lines). —Service Electric Co., Ltd., Stanmore, Middx. (D 15)

ARMATURE REWINDING SERVICE to the Trade. Vacuums, Drills, Grinders, Hood Dryers, Dental Motors, Vacuum Cleaner and Drill Armatures replaced from stock. 24-hour service. Every job guaranteed. All vacuum cleaner parts, hoses, etc., in stock for any make. —Regam Electric Cleaner Service, 95-97 Park Lane, Leeds 1. (D 31)

WORK WANTED. Capacity available for all types of COIL WINDING.—Box No. 2425, Electrical Times. (D 36)

WANTED

A.C.-D.C. MOTORS, STARTERS, complete change-over installations, etc.—A.A. Electrical Co. Ltd., 67 Rothschild Road, Chiswick Park, W.4. Tel.: Chiswick 5105. (D 9)

ADVERTISER requires regular supplies secondhand upright VACUUM CLEANERS.—Box No. 2439, Electrical Times. (D 39)

CONVERSION EQUIPMENT, 11,000 volts 50/3 to 500/550 d.c.—Apply, West Wales Electric, Ltd., Portmadoc. (D 73)

ELECTRICAL CONTRACTOR requires MEG and MEGGAR TESTING SETS—all types.—Particulars to Box No. 2453, Electrical Times. (D 56)

WANTED, D.C. and A.C. ball-bearing MOTORS, MOTOR GENERATOR SETS, DYNAMOS and ALTERNATORS.—Full details to Britannia Manufacturing Co., Ltd., 22-26 Britannia Walk, London N.1. (D 5)

WANTED for prompt cash, ferrous and non-ferrous SCRAP; also plant for dismantling. Buyers of secondhand machinery and plant for re-use.—W. and H. Cooper, Ltd., 176 Brady Street, Bethnal Green, E.1. (D 1)

WANTED, Large quantity of 4-in. outside diameter TUBES from the dismantling of old Babcock water tube boilers. Best prices paid. Prepared to purchase Babcock and Wilcox water tube boilers for dismantling. Apply, giving full details to Midland Iron and Hardware Co., Cradley Heath, Staffs. (D 2)

WANTED, ROTARY CONVERTERS, any size.—Universal, 221 City Road, London E.C.1. (D 7)

AGENCIES

COMMISSION AGENTS wanted, calling on wholesalers. Eastern and southern areas available. Wrought iron lighting fittings, heath lamps, ships' fittings, conduit fittings. Please give full information in confidence, and state area covered.—Box No. 2401, Electrical Times. (D 29)

BUSINESS OPPORTUNITIES

WYNSTRUMENTS, LTD., of Staverton Aerodrome, Cheltenham Road, Gloucester, are open to consider the design, development, manufacture and marketing of any new invention relating to aircraft instruments, and/or small aircraft electrical accessories.—Particulars should be addressed for the attention of the Managing Director. (D 95)

FOR SALE

CABLES & WIRE

PAPER INSULATED CABLES

of all sizes and all voltages at highly competitive prices.

Messrs. A. & H. EVANS

Birkbeck Road, Ilford, Essex

have a complete range between 11,000 and 660 V. and invite your inquiries.

Telephone: VALentine 2567 (D 40p)

FOR SALE, 47 silk-covered Eureka WIRE; 500 lbs., as new.—Box No. 2423, Electrical Times. (D 35)

1,000 YARDS 19·064 C.M.A. CABLE, 30, 50, 100 am. I/C Switchgear.—141 Bellenden Road, Peckham, London S.E.15. (D 96)

GENERATING PLANT

MOTOR GENERATOR SETS, CONTROL PANELS, built to individual requirements. Good deliveries at competitive prices. All equipment guaranteed.—Thos. W. Ward, Ltd., Albion Works, Sheffield. Phone 26311 (ex 347). (D 32)

ONE 55-kW A.B.O.E. diesel-electric GENERATING SET, comprising McLaren engine alternator and switchgear. Run for only two or three weeks. £1,200. —London Rubber Co., Ltd., North Circular Road, Chingford, E.4. (D 30)

LIGHTING EQUIPMENT

PURLEY CHOKES AND BALLASTS. Our 80 W tapped h.p.f. ballast, with starter switchgear-holder incorporated is proving itself the most popular unit. Suitable for most fittings, 57s. 6d. each, subject.—F. W. Blanshard, Ltd. (Dept. E.T.), Purley, Surrey. Uplands 4818-9. (D 16)

METERS

A.C./D.C. QUARTERLY and SLOT METERS.—Brent Electrical Co., 6 Holmdale Gardens, London N.W.4. (D 6)

HOUSE-SERVICE METERS, a.c. or d.c., quarterly or prepayment.—Universal Electrical, 221 City Road, London E.C.1. (D 11)

MOTORS & STARTERS

A.A. ELECTRICAL CO. FOR A.C./D.C. MOTORS, SWITCHGEAR, EXHAUST FANS, HOISTS, REDUCTION GEARS, new or reconditioned units.—Chiswick 5105. Chiswick 5605. 67 Rothschild Road, W.4. (D 8)

A.C. and D.C. MOTORS, all sizes, large stocks. Fully guaranteed.—Milo Engineering Works Ltd., Milo Road, East Dulwich, S.E.22. (Forest Hill 2278-9.) (D 4)

A.C. and D.C. MOTORS, GENERATORS, from stock.—Service Electric Co., Ltd., Honeypot Lane, Stanmore, Middx. Edgware 5566-9. (D 10)

BATCH of 12 L. D. and C. "Maxtorq" Squirrel-cage MOTORS, 400 V 3 ph. 50 c/s. 12 h.p., 750 r.p.m. Complete with starting gear.—Box No. 2463, Electrical Times. (D 104)

ELECTRICAL MOTORS (400/440/3/50). 280-h.p., 750 r.p.m. SYNCHRONOUS MOTOR by Verity, protected frame-endshield ball bearings, complete with direct coupled exciter 6-kW 200 amps. On bedplate. With control gear.
225-h.p. 485 r.p.m. S/R. INDUCTION MOTOR by B.T.H., protected frame endshield ring oil bearings, outer third pedestal bearing. On bedplate. With driving pulley and control gear.
175-h.p. 480 r.p.m. S/R. INDUCTION MOTOR by B.T.H., protected frame, two endshield ring oil bearings. With control gear.
Two 120-h.p. 585 r.p.m. S/R. INDUCTION MOTOR by Met.-Vick., screen protected, two endshield ball bearings.
George Cohen, Sons and Co., Ltd., Wood Lane, London, W.12 (Tel.: Shepherds Bush 2070), and Stanningley, Nr. Leeds (Tel.: Pudsey 2241). (D 57)

FOR ELECTRICAL MOTORS, GENERATORS, ALTERNATORS, SWITCHGEAR, please send your inquiries to Oldfield Engineering Co., Ltd., 96 East Ordsall Lane, Salford 5. (D 13)

GEARED MOTORS, new, in stock. From 1 r.p.m. to 4 h.p. spur or worm gears by well-known makers.—Super Power Ltd., 81 North Side, Clapham Common, S.W.4. Battersea 3355. (D 22)

MOTORS, fractional. All types, all sizes, including flame-proof and geared, speeds 1 r.p. week to 20,000 r.p.m.—Jeary Electrical Co., Ltd., 324 Old Street, E.C.1. (Tel.: Sho. 7511.) (D 37)

All types and sizes of

Industrial Electrical Equipment

ELECTROPOWER COMPANY LIMITED
Kingsbury Works, Kingsbury Road, London N.W.9.
Telephone: COLindale 4621/2. (D 14p)

NEW A.C. MOTORS FROM STOCK. ¼ to 200 h.p. 400 V 3 ph. 50 cycles at 600, 750, 1,000 and 1,500 r.p.m. Immediate dispatch, competitive prices.—Thos. W. Ward, Ltd., Albion Works, Sheffield. Phone 26311 (ex 347). (D 33)

SWITCHGEAR

MERCURY SWITCHES are made by Hall Drysdale and Co., Ltd., of 58 Commerce Road, Wood Green, London N.22. Tel.: Bow 7221. (D 12)

UNCLASSIFIED

A.C. and d.c. MOTORS, DIESEL ALTERNATOR SETS, GENERATORS, TRANSFORMERS, WELDERS, PLATING PLANT, CONTROL GEAR, SWITCHGEAR, PORTABLE TOOLS, etc. Stock list post free.—Thos. W. Ward Ltd., Albion Works, Sheffield. Phone 26311 (ex 347). (D 34)

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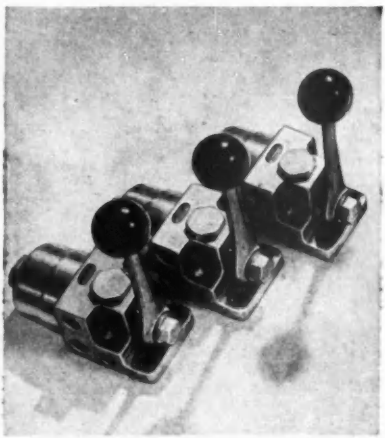

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Belling & Co., Ltd. 6
Belmos Co., Ltd. 37
Bill Switchgear, Ltd. 5
Birch, H. A., & Co., Ltd. ... 61
Birmingham Aluminium Casting (1903) Co., Ltd. 21
Brighton Laminations, Ltd. ... 18
British Electric Lamps, Ltd. ... 10
British Electric Resistance Co., Ltd. 28
British Insulated Callender's Cables, Ltd. 1
British National Electrics, Ltd. ... 2
British Thomson-Houston Co., Ltd. 36
Brush Electrical Engineering Co., Ltd. 34

Carter & Co. (Nelson), Ltd. ... 14
Carter, B. & F. & Co. Ltd. ... 54
Chloride Batteries, Ltd. ... 38
Connollys (Blackley), Ltd. ... 59
Cressall Manufacturing Co., Ltd. 4

Deco Engineering Co., Ltd. ... 10
Dorman & Smith, Ltd. ... 40, 74
Drake & Gorham Wholesale, Ltd. 68

Electrical Instrument Co. (Hillington), Ltd. 68
Electrical Remote Control Co. Ltd. 54
Engineering & Lighting Equipment Co., Ltd. 16
English Electric Co., Ltd. ... 33
Everett Edgcumbe, Ltd. 11

Ferranti, Ltd. 41
Fluxite, Ltd. 10
Foster Transformers, Ltd. ... 17
Fry's Metal Foundries, Ltd. ... 42

Geipel, Wm., Ltd. 66
General Electric Co., Ltd. 12, 31, 67
Gilflex Conduits, Ltd. 74
Glover, W. T., & Co., Ltd. ... 73

Hackbridge & Hewittic Electric Co., Ltd. 30
Henley's, W.T., Telegraph Works, Co., Ltd. 45
Hivac, Ltd. 28
Holophane, Ltd. 13
Hoover, Ltd. 44
Horstmann Gear Co., Ltd. ... 70
Howard Clayton-Wright, Ltd. ... 4

Igranic Electric Co., Ltd. ... 72
International Combustion, Ltd. ... 7

Jackson Boilers, Ltd. 65
Johnson & Phillips, Ltd. ... 69

Key Engineering Co., Ltd. ... 70

Lang Pneumatic, Ltd. 54
Laurence, Scott & Electromotors, Ltd. 3
Legg (Industries), Ltd. 18
Lewis Spring Co., Ltd. 22
Lindley Thompson Transformer and Service Co., Ltd. 29
L.P.S. Electrical Co., Ltd. ... 60

Martindale Electric Co., Ltd. ... 56
Metropolitan-Vickers Electrical Co., Ltd. 9, 46
Metway Electrical Industries, Ltd. 32
Midland Electric Manufacturing Co., Ltd. 57
M.K. Electric, Ltd. 35
Morley's Electrical Services, Ltd. 58

Nathan & Allen, Ltd. 4
Nettle Accessories, Ltd. 39

Philips Electrical, Ltd. 19
Pinchin Johnson & Co. 62
Powell Duffryn Carbon Products, Ltd. 58
Premier Cooler & Engineering Co., Ltd. 64

Revo Electric Co., Ltd. 8
Rotunda, Ltd. 32

Sanders, William, & Co. (Wednesbury), Ltd. 71
Scemco, Ltd. 66
Scholes, Geo. H., & Co., Ltd. ... 24
Scott, Hugh J., & Co. (Belfast), Ltd. 66
Siemens Bros. & Co., Ltd. ... 26
Simmonds & Stokes (Niphan), Ltd. 14
South Wales Switchgear, Ltd. ... 60
Spencer Wire Co., Ltd. 22
Sperryn & Co., Ltd. 62
Statter, J. G., & Co., Ltd. ... 68
Sterling Cable Co. 63

Taylor Tunnicliff & Co., Ltd. ... 25
Transformer & Electrical Co., Ltd. 66

Universal Boilers & Engineering Co., Ltd. 23
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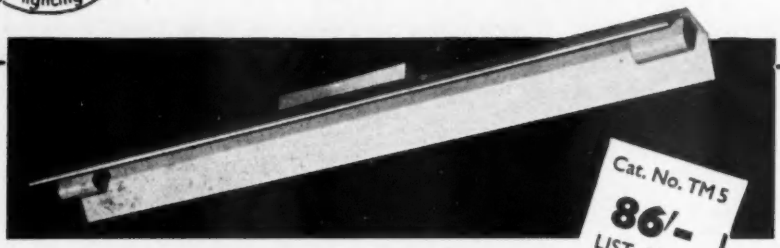

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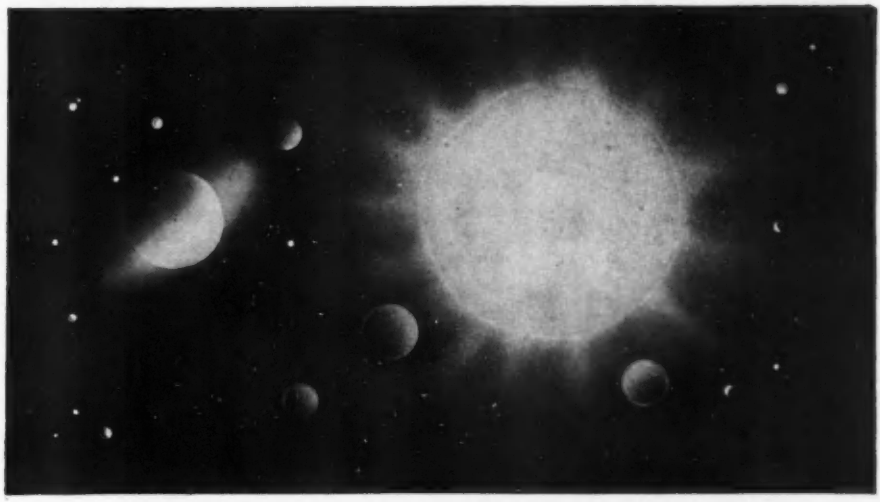

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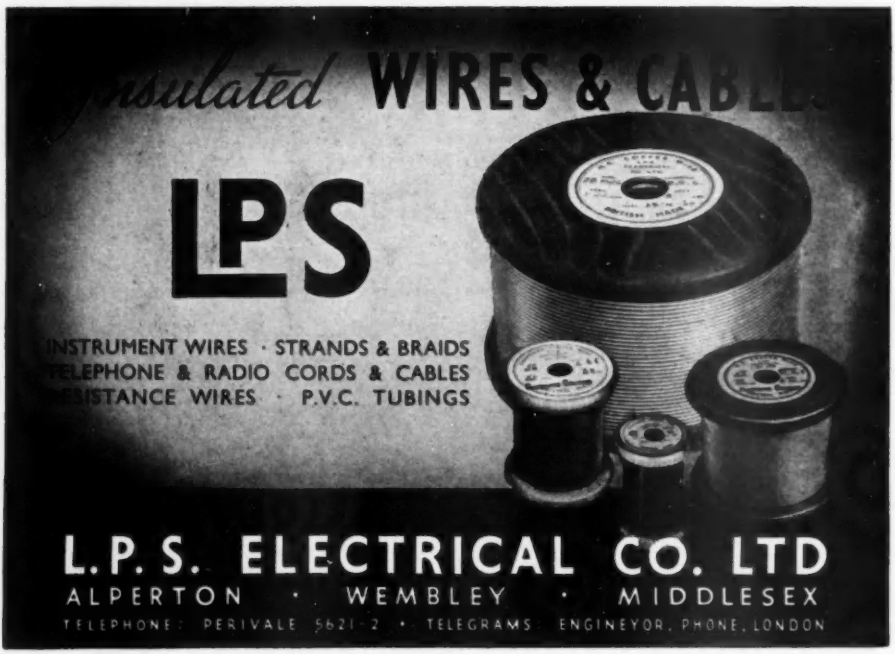
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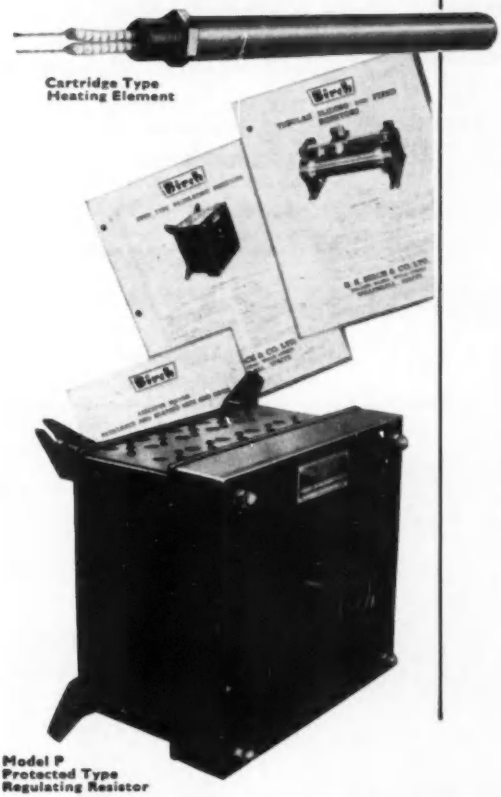

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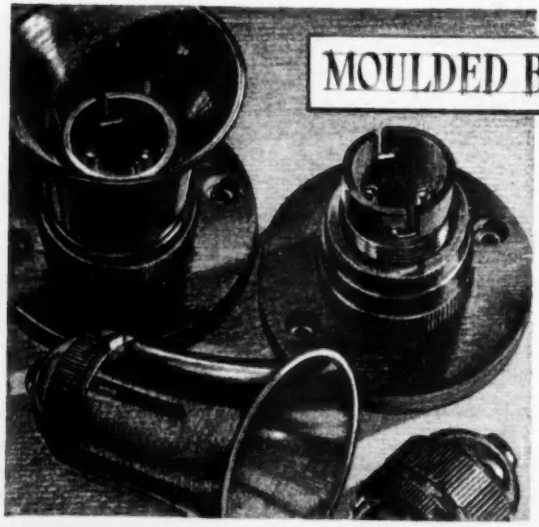

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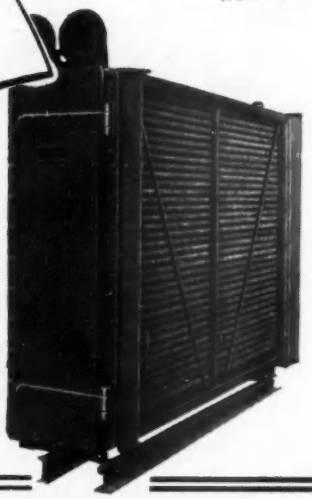

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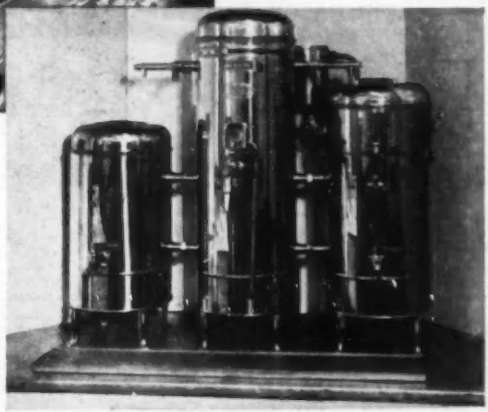

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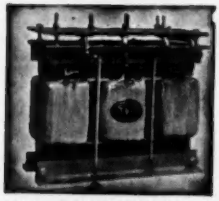

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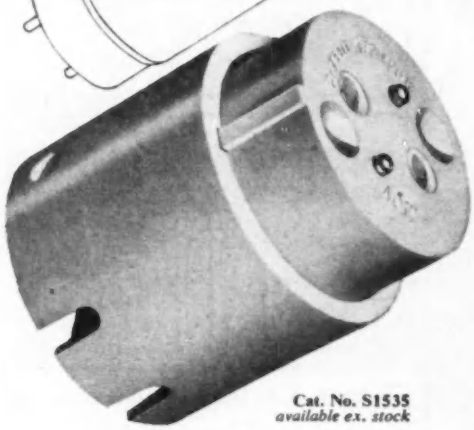

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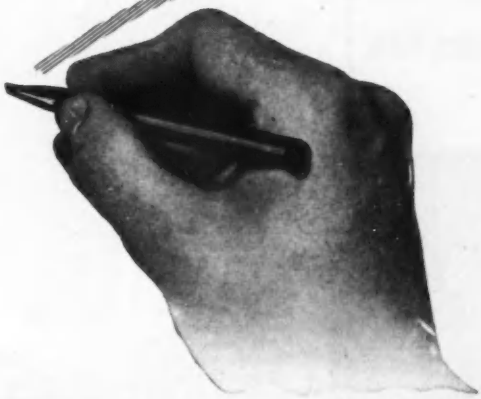

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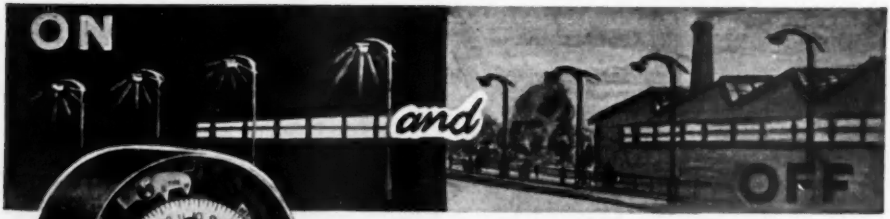

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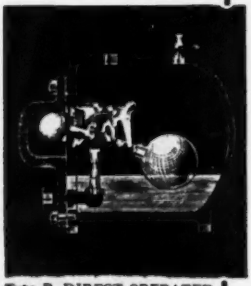

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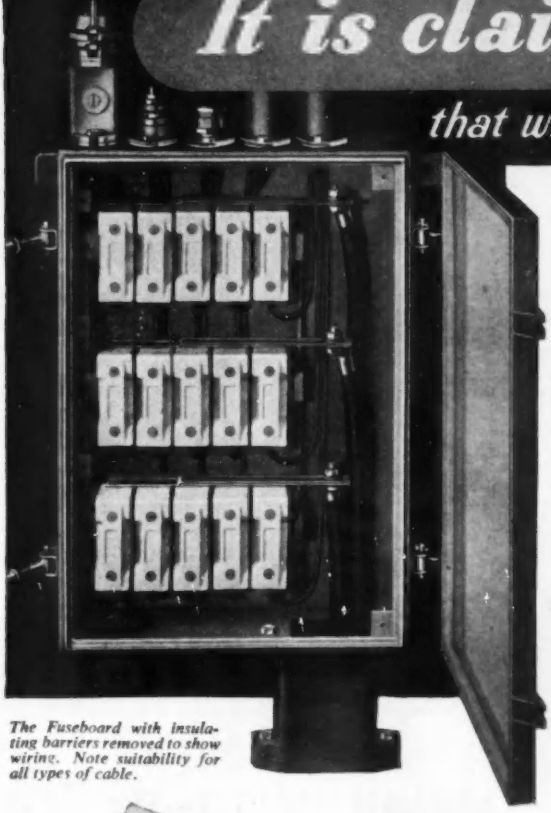

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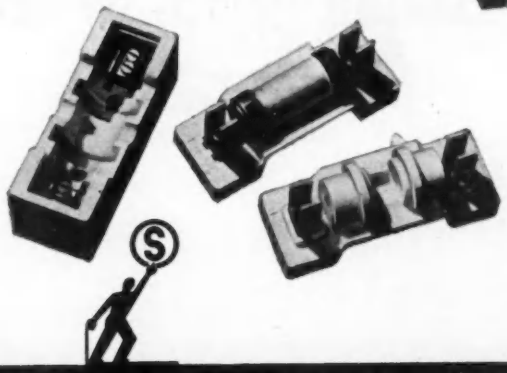

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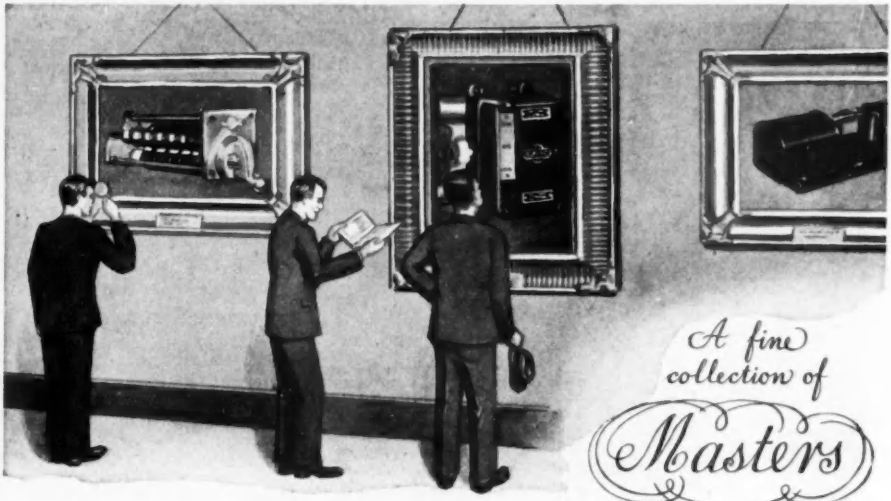

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